A Report files

Below in Sections A.1–A.3 we present reports files generated by the program.

A.1 Four bodies

```
SPATIAL CASE
=============================================================
Number of bodies = 4
EQUAL MASSES

Accuracy eps = 1e-05, bias = 0.02, biasCute = 0.001
MAX_ASYNCH_DEPTH = 512
-------------------------------------------------------------



Wed Mar 25 12:04:26 2020
Input data:
i: 0 X: [-3.005, 3.002] Y: [-0.005, 3.002] Z: [0, 0]
i: 1 X: [-3.005, 3.002] Y: [-3.005, 3.002] Z: [-0.005, 3.002]
i: 2 X: [0.495, 3.002] Y: [0, 0] Z: [0, 0]
i: 3 X: [-3, 3] Y: [-3, 3] Z: [-3, 0.005]


The number of zeros in the method: 13

Tests usage:
checkAprioriBounds -- 0
clusterTest -- 678
distanceTest -- 12154
checkZero -- 35240
krawczyk: methodFailed  -- 14310
krawczyk: zeroIside -- 13
krawczyk: no zero inside -- 8176
U = I -- 408
improvement in clusterTest -- 522
improvement in U = I Test -- 452

Number of checked boxes = 113337

The number of CC found in the search phase 13

Different CC:
=============================================================



position 0
```

```
i: 0 X: [-0.9052152739, -0.9050418002] Y: [-0.000318479959,
   0.0003184804964] Z: [0, 0]
i: 1 X: [-0.2863433982, -0.286138622] Y: [-8.362218819e-05,
   8.362231818e-05] Z: [-2.769825996e-05, 2.769825748e-05]
i: 2 X: [0.9049828589, 0.9052742152] Y: [0, 0] Z: [0, 0]
i: 3 X: [0.2859062071, 0.2865758133] Y: [-0.0004021028146,
   0.0004021021472] Z: [-2.769825748e-05, 2.769825996e-05]
Distances from 0:
0:     [0.9050418002, 0.9052153299]
1:     [0.286138622, 0.2863434118]
2:     [0.9049828589, 0.9052742152]
3:     [0.2859062071, 0.2865760967]

U = [0.4503692876, 0.450822491], I = [0.4504280763, 0.4507636517], U
   *(I)^(1/2)/(M)^(5/2) = [0.3022605675, 0.3026774166]
collinear solution no 1
```

```
position 3
```

```
i: 0 X: [-1.368511824e-12, 1.368511514e-12] Y: [0.6208215741,
   0.6208215741] Z: [0, 0]
i: 1 X: [-1.313869102e-12, 1.313860284e-12] Y: [-0.6208215741,
   -0.6208215741] Z: [-9.909218997e-13, 9.909218982e-13]
i: 2 X: [0.6208215741, 0.6208215741] Y: [0, 0] Z: [0, 0]
i: 3 X: [-0.6208215741, -0.6208215741] Y: [-2.754130257e-12,
   2.754019235e-12] Z: [-9.909218982e-13, 9.909218997e-13]
Distances from 0:
0:     [0.6208215741, 0.6208215741]
1:     [0.6208215741, 0.6208215741]
2:     [0.6208215741, 0.6208215741]
3:     [0.6208215741, 0.6208215741]

U = [0.3854194269, 0.3854194269], I = [0.3854194269, 0.3854194269], U
   *(I)^(1/2)/(M)^(5/2) = [0.2392766953, 0.2392766953]
planar solution no 1
```

```
position 8
```

```
i: 0 X: [-0.3666565003, -0.3666565] Y: [0.6350676871, 0.6350676872] Z
   : [0, 0]
```

```
i: 1 X: [-0.3666565003, -0.3666565] Y: [-0.6350676872, -0.6350676871]
    Z: [-5.583631132e-36, 5.583631132e-36]
i: 2 X: [0.7333130003, 0.7333130003] Y: [0, 0] Z: [0, 0]
i: 3 X: [-2.554015888e-10, 2.554014777e-10] Y: [-7.235934074e-11,
   7.236067301e-11] Z: [-5.583631132e-36, 5.583631132e-36]
Distances from 0:
0:     [0.7333130002, 0.7333130004]
1:     [0.7333130002, 0.7333130004]
2:     [0.7333130003, 0.7333130003]
3:     [0, 2.654544001e-10]

U = [0.4033109672, 0.4033109674], I = [0.4033109672, 0.4033109674], U
   *(I)^(1/2)/(M)^(5/2) = [0.2561297631, 0.2561297633]
planar solution no 2
```

```
position 9
```

```
i: 0 X: [-0.2041343063, -0.2041139841] Y: [0.5773458764, 0.577354662]
    Z: [0, 0]
i: 1 X: [-0.204135045, -0.2041132455] Y: [-0.2886834906,
   -0.2886667786] Z: [0.4999966533, 0.5000033467]
i: 2 X: [0.6123687009, 0.6123761705] Y: [0, 0] Z: [0, 0]
i: 3 X: [-0.2041489409, -0.2040993496] Y: [-0.2886878834,
   -0.2886623858] Z: [-0.5000033467, -0.4999966533]
Distances from 0:
0:     [0.6123649071, 0.6123799644]
1:     [0.6123621309, 0.6123827406]
2:     [0.6123687009, 0.6123761705]
3:     [0.6123554285, 0.6123894437]

U = [0.3749940943, 0.3750059058], I = [0.3749881889, 0.3750118117], U
   *(I)^(1/2)/(M)^(5/2) = [0.2296324305, 0.2296468965]
```

```
Permutation: 0 3 2 1, cycles: (0)(1,3)(2)
Orthogonal transformation: {
{[0.9999878023, 1.000012198],[0, 0],[0, 0]},
{[-4.382398693e-05, 4.382505605e-05],[0.999984782, 1.000015217],[0,
   0]},
{[-0, 0],[-0, 0],[-1.000027415, -0.9999725844]}
}
det(R) = -1
```

```
Reflection with respect to the bisecting plane of the segment [q3, q1
    ]
```

```
Permutation: 1 3 2 0, cycles: (0,1,3)(2)
Orthogonal transformation: {
{[0.9999878023, 1.000012198],[0, 0],[0, 0]},
{[-4.638305793e-05, 4.638418948e-05],[-0.5000206015,
    -0.4999793984],[0.866008992, 0.866041815]},
{[0, 0],[-0.8660523788, -0.8659984286],[-0.5000267007,
    -0.4999732998]}
}
det(R) = 1
Rotation axis: 0-q2
Rotation angle = 2*Pi/3
```

```
Permutation: 1 0 2 3, cycles: (0,1)(2)(3)
Orthogonal transformation: {
{[0.9999878023, 1.000012198],[0, 0],[0, 0]},
{[-4.638305793e-05, 4.638418948e-05],[-0.5000206015,
    -0.4999793984],[0.866008992, 0.866041815]},
{[-0, -0],[0.8659984286, 0.8660523788],[0.4999732998, 0.5000267007]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q1, q0
    ]
```

```
Permutation: 3 0 2 1, cycles: (0,3,1)(2)
Orthogonal transformation: {
{[0.9999878023, 1.000012198],[0, 0],[0, 0]},
{[-9.452017554e-05, 9.452248144e-05],[-0.5000301125,
    -0.4999698861],[-0.8660451097, -0.8660056945]},
{[-0, 0],[0.8659951312, 0.8660556735],[-0.5000362118, -0.4999637877]}
}
det(R) = 1
Rotation axis: 0-q2
Rotation angle = 2*Pi/3
```

```
Permutation: 3 1 2 0, cycles: (0,3)(1)(2)
Orthogonal transformation: {
{[0.9999878023, 1.000012198],[0, 0],[0, 0]},
{[-9.452017554e-05, 9.452248144e-05],[-0.5000301125,
   -0.4999698861],[-0.8660451097, -0.8660056945]},
{[-0, 0],[-0.8660556735, -0.8659951312],[0.4999637877, 0.5000362118]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q0
   ]
```

```
Permutation: 1 2 0 3, cycles: (0,1,2)(3)
Orthogonal transformation: {
{[-0.3333540246, -0.3333126425],[0.9427902772, 0.9428278063],[0, 0]},
{[-0.471458202, -0.4713508427],[-0.1667277156,
   -0.1666056197],[0.8659915476, 0.8660592586]},
{[0.8164484113, 0.8165447508],[0.2886459311,
   0.2887043394],[0.499916751, 0.5000832574]}
}
det(R) = 1
Rotation axis: 0-q3
Rotation angle = 2*Pi/3
```

```
Permutation: 1 3 0 2, cycles: (0,1,3,2)
Orthogonal transformation: {
{[-0.3333540246, -0.3333126425],[0.9427902772, 0.9428278063],[0, 0]},
{[-0.471458202, -0.4713508427],[-0.1667277156,
   -0.1666056197],[0.8659915476, 0.8660592586]},
{[-0.8165447508, -0.8164484113],[-0.2887043394,
   -0.2886459311],[-0.5000832574, -0.499916751]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 2 3 0 1, cycles: (0,2)(1,3)
Orthogonal transformation: {
{[-0.3333540246, -0.3333126425],[0.9427902772, 0.9428278063],[0, 0]},
{[0.9427586036, 0.9428594815],[0.3332938583, 0.3333728126],[0, 0]},
{[-0, 0],[0, 0],[-1.000085305, -0.9999147019]}
```

```
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 2 1 0 3, cycles: (0,2)(1)(3)
Orthogonal transformation: {
{[-0.3333540246, -0.3333126425],[0.9427902772, 0.9428278063],[0, 0]},
{[0.9427586036, 0.9428594815],[0.3332938583, 0.3333728126],[0, 0]},
{[-0, 0],[-0, -0],[0.9999147019, 1.000085305]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q0
   ]
```

```
Permutation: 3 1 0 2, cycles: (0,3,2)(1)
Orthogonal transformation: {
{[-0.3333540246, -0.3333126425],[0.9427902772, 0.9428278063],[0, 0]},
{[-0.4714955353, -0.4713135132],[-0.1667525516,
   -0.1665807876],[-0.8660743178, -0.8659764869]},
{[-0.8165589491, -0.8164342122],[-0.2887093595,
   -0.2886409112],[0.4998732802, 0.5001267354]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/3
```

```
Permutation: 3 2 0 1, cycles: (0,3,1,2)
Orthogonal transformation: {
{[-0.3333540246, -0.3333126425],[0.9427902772, 0.9428278063],[0, 0]},
{[-0.4714955353, -0.4713135132],[-0.1667525516,
   -0.1665807876],[-0.8660743178, -0.8659764869]},
{[0.8164342122, 0.8165589491],[0.2886409112,
   0.2887093595],[-0.5001267354, -0.4998732802]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 0 3 1 2, cycles: (0)(1,3,2)
Orthogonal transformation: {
{[-0.3333567422, -0.3333099252],[-0.4714260991,
   -0.4713829431],[0.8164773763, 0.816515786]},
{[-0.4714707219, -0.471338329],[0.8332514539,
   0.8334152198],[0.2886195864, 0.2887306905]},
{[-0.8166118664, -0.8163813109],[-0.2887635144,
   -0.2885867598],[-0.5000881858, -0.4999118285]}
}
det(R) = 1
Rotation axis: 0-q0
Rotation angle = 2*Pi/3
```

```
Permutation: 0 2 1 3, cycles: (0)(1,2)(3)
Orthogonal transformation: {
{[-0.3333567422, -0.3333099252],[-0.4714260991,
   -0.4713829431],[0.8164773763, 0.816515786]},
{[-0.4714707219, -0.471338329],[0.8332514539,
   0.8334152198],[0.2886195864, 0.2887306905]},
{[0.8163813109, 0.8166118664],[0.2885867598,
   0.2887635144],[0.4999118285, 0.5000881858]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q1
   ]
```

```
Permutation: 2 0 1 3, cycles: (0,2,1)(3)
Orthogonal transformation: {
{[-0.3333567422, -0.3333099252],[-0.4714260991,
   -0.4713829431],[0.8164773763, 0.816515786]},
{[0.9427531583, 0.942864927],[-0.1666927006,
   -0.1666406364],[0.2886364719, 0.2887138021]},
{[-4.891186459e-05, 4.891186459e-05],[0.865942026,
   0.8661087895],[0.4999407364, 0.5000592701]}
}
det(R) = 1
Rotation axis: 0-q3
Rotation angle = 2*Pi/3
```

```
Permutation: 2 3 1 0, cycles: (0,2,1,3)
Orthogonal transformation: {
{[-0.3333567422, -0.3333099252],[-0.4714260991,
   -0.4713829431],[0.8164773763, 0.816515786]},
{[0.9427531583, 0.942864927],[-0.1666927006,
   -0.1666406364],[0.2886364719, 0.2887138021]},
{[-4.891186459e-05, 4.891186459e-05],[-0.8661087895,
   -0.865942026],[-0.5000592701, -0.4999407364]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 3 2 1 0, cycles: (0,3)(1,2)
Orthogonal transformation: {
{[-0.3333567422, -0.3333099252],[-0.4714260991,
   -0.4713829431],[0.8164773763, 0.816515786]},
{[-0.471530581, -0.47127849],[-0.6668022068,
   -0.666531157],[-0.5774811069, -0.5772194591]},
{[0.8162990177, 0.8166941935],[-0.5775193835,
   -0.5771811998],[-0.0001303723529, 0.0001303696856]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 3 0 1 2, cycles: (0,3,2,1)
Orthogonal transformation: {
{[-0.3333567422, -0.3333099252],[-0.4714260991,
   -0.4713829431],[0.8164773763, 0.816515786]},
{[-0.471530581, -0.47127849],[-0.6668022068,
   -0.666531157],[-0.5774811069, -0.5772194591]},
{[-0.8166941935, -0.8162990177],[0.5771811998,
   0.5775193835],[-0.0001303696856, 0.0001303723529]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 0 2 3 1, cycles: (0)(1,2,3)
Orthogonal transformation: {
{[-0.3333830834, -0.3332835856],[-0.4714384327,
   -0.4713706102],[-0.8165247231, -0.8164684393]},
{[-0.4714994855, -0.4713095775],[0.8332152739,
   0.8334514063],[-0.2887590174, -0.2885912681]},
{[0.8163274164, 0.8166657773],[0.2885420236,
   0.2888082542],[-0.5001415781, -0.4998584572]}
}
det(R) = 1
Rotation axis: 0-q0
Rotation angle = 2*Pi/3
```

```
Permutation: 0 1 3 2, cycles: (0)(1)(2,3)
Orthogonal transformation: {
{[-0.3333830834, -0.3332835856],[-0.4714384327,
   -0.4713706102],[-0.8165247231, -0.8164684393]},
{[-0.4714994855, -0.4713095775],[0.8332152739,
   0.8334514063],[-0.2887590174, -0.2885912681]},
{[-0.8166657773, -0.8163274164],[-0.2888082542,
   -0.2885420236],[0.4998584572, 0.5001415781]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q2
   ]
```

```
Permutation: 1 0 3 2, cycles: (0,1)(2,3)
Orthogonal transformation: {
{[-0.3333830834, -0.3332835856],[-0.4714384327,
   -0.4713706102],[-0.8165247231, -0.8164684393]},
{[-0.4715214163, -0.4712876571],[-0.666806865,
   -0.6665265012],[0.5772047145, 0.5774958529]},
{[-0.8167180305, -0.8162751907],[0.5771643547,
   0.577536242],[-0.0001509752693, 0.0001509781938]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 1 2 3 0, cycles: (0,1,2,3)
Orthogonal transformation: {
{[-0.3333830834, -0.3332835856],[-0.4714384327,
   -0.4713706102],[-0.8165247231, -0.8164684393]},
{[-0.4715214163, -0.4712876571],[-0.666806865,
   -0.6665265012],[0.5772047145, 0.5774958529]},
{[0.8162751907, 0.8167180305],[-0.577536242,
   -0.5771643547],[-0.0001509781938, 0.0001509752693]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 2 1 3 0, cycles: (0,2,3)(1)
Orthogonal transformation: {
{[-0.3333830834, -0.3332835856],[-0.4714384327,
   -0.4713706102],[-0.8165247231, -0.8164684393]},
{[0.9427081562, 0.942909934],[-0.1667148986,
   -0.1666184467],[-0.2887478555, -0.2886024291]},
{[-8.813331354e-05, 8.813331354e-05],[-0.8661729231,
   -0.8658779093],[0.4998961121, 0.5001039084]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/3
```

```
Permutation: 2 0 3 1, cycles: (0,2,3,1)
Orthogonal transformation: {
{[-0.3333830834, -0.3332835856],[-0.4714384327,
   -0.4713706102],[-0.8165247231, -0.8164684393]},
{[0.9427081562, 0.942909934],[-0.1667148986,
   -0.1666184467],[-0.2887478555, -0.2886024291]},
{[-8.813331354e-05, 8.813331354e-05],[0.8658779093,
   0.8661729231],[-0.5001039084, -0.4998961121]}
}
det(R) = -1
Rotation angle = 2*Pi/4


Number of non-trivial symmetries = 23
```

```
position 10
```

```
i: 0 X: [-0.3822195304, -0.3821678591] Y: [0.6195161934,
   0.6195531123] Z: [0, 0]
i: 1 X: [-0.3822187692, -0.3821686203] Y: [-0.6195523021,
   -0.6195170036] Z: [-1.002038436e-26, 1.002038436e-26]
i: 2 X: [0.7436378149, 0.7436603506] Y: [0, 0] Z: [0, 0]
i: 3 X: [0.02067612876, 0.02080048465] Y: [-3.61087036e-05,
   3.61087036e-05] Z: [-1.002038436e-26, 1.002038436e-26]
Distances from 0:
0:     [0.7279097378, 0.727968288]
1:     [0.727910827, 0.7279671988]
2:     [0.7436378149, 0.7436603506]
3:     [0.02067612876, 0.02080051599]

U = [0.4032739412, 0.4033432897], I = [0.4032828651, 0.4033343624], U
   *(I)^(1/2)/(M)^(5/2) = [0.2560973264, 0.2561577193]
planar solution no 3

Number of different cc = 5
```

```
real 3.76
user 14.85
sys 12.68
```

A.2 Five bodies

SPATIAL CASE

```
Number of bodies = 5
EQUAL MASSES

Accuracy eps = 1e-05, bias = 0.02, biasCute = 0.001
MAX_ASYNCH_DEPTH = 512
```

```
Wed Mar 25 12:04:48 2020
Input data:
i: 0 X: [-4.005, 4.002] Y: [-0.005, 4.002] Z: [0, 0]
i: 1 X: [-4.005, 4.002] Y: [-4.005, 4.002] Z: [-0.005, 4.002]
i: 2 X: [-4.005, 4.002] Y: [-4.005, 4.002] Z: [-4.005, 4.002]
i: 3 X: [0.495, 4.002] Y: [0, 0] Z: [0, 0]
i: 4 X: [-4, 4] Y: [-4, 4] Z: [-4, 4]
```

```
The number of zeros in the method: 30

Tests usage:
checkAprioriBounds -- 90
clusterTest -- 289600
distanceTest -- 14000449
checkZero -- 35765133
krawczyk: methodFailed  -- 4470279
krawczyk: zeroIside -- 30
krawczyk: no zero inside -- 3322280
U = I -- 116155
improvement in clusterTest -- 124893
improvement in U = I Test -- 92303

Number of checked boxes = 106987473

The number of CC found in the search phase 30

Different CC:
================================================================================

position 0
================================================================================

i: 0 X: [-1.020108475, -1.018403488] Y: [-0.002343810886,
   0.00234381092] Z: [0, 0]
i: 1 X: [-0.0004765508032, 0.0004765508056] Y: [-0.001245117102,
   0.001245117105] Z: [-2.053799834e-05, 2.053799834e-05]
i: 2 X: [0.4803728091, 0.4811620688] Y: [-0.001066621489,
   0.001066621489] Z: [-2.222993612e-05, 2.222993612e-05]
i: 3 X: [1.018937096, 1.019574867] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.4828099987, -0.4787248793] Y: [-0.004655549515,
   0.004655549476] Z: [-4.276793445e-05, 4.276793447e-05]
Distances from 0:
0:     [1.018403488, 1.020111168]
1:     [0, 0.001333356323]
2:     [0.4803728091, 0.4811632515]
3:     [1.018937096, 1.019574867]
4:     [0.4787248793, 0.4828324459]

U = [0.506651468, 0.5093605111], I = [0.5070628031, 0.5089613454], U
   *(I)^(1/2)/(M)^(5/2) = [0.3607781122, 0.3633855658]
collinear solution no 1
================================================================================
```

```
position 6
=============================================================================

i: 0 X: [-0.0004087627543, 0.0004087627543] Y: [0.731381639,
   0.7316200745] Z: [0, 0]
i: 1 X: [-0.0004076002585, 0.0004076002585] Y: [-0.7316222121,
   -0.7313795014] Z: [-4.061869109e-06, 4.061869109e-06]
i: 2 X: [-0.0001982146272, 0.0001982146272] Y: [-0.0002608763625,
   0.0002608763625] Z: [-3.477897188e-07, 3.477897188e-07]
i: 3 X: [0.7314163281, 0.7315853854] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.7325999631, -0.7304017505] Y: [-0.0005014494607,
   0.0005014494607] Z: [-4.409658828e-06, 4.409658828e-06]
Distances from 0:
0:     [0.731381639, 0.7316201887]
1:     [0.7313795014, 0.7316223257]
2:     [0, 0.0003276364386]
3:     [0.7314163281, 0.7315853854]
4:     [0.7304017505, 0.7326001347]

U = [0.4277284584, 0.4284218491], I = [0.4276583278, 0.4284919138], U
   *(I)^(1/2)/(M)^(5/2) = [0.2797155518, 0.2804419167]
planar solution no 1
=============================================================================

position 15
=============================================================================

i: 0 X: [-4.495466427e-08, 4.495466448e-08] Y: [0.6320402881,
   0.6320403037] Z: [0, 0]
i: 1 X: [-7.121735369e-08, 7.121735376e-08] Y: [-0.3160202782,
   -0.3160200177] Z: [0.5473628784, 0.5473630265]
i: 2 X: [-7.039754173e-08, 7.039754147e-08] Y: [-0.3160202805,
   -0.3160200154] Z: [-0.5473630281, -0.5473628768]
i: 3 X: [0.6453811864, 0.6453811979] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.6453813845, -0.6453809998] Y: [-2.705661542e-07,
   2.705661544e-07] Z: [-1.4967882e-07, 1.496788205e-07]
Distances from 0:
0:     [0.6320402881, 0.6320403037]
1:     [0.6320401666, 0.6320404251]
2:     [0.6320401641, 0.6320404277]
3:     [0.6453811864, 0.6453811979]
4:     [0.6453809998, 0.6453813845]

U = [0.4062916146, 0.4062918147], I = [0.4062915955, 0.4062918337], U
   *(I)^(1/2)/(M)^(5/2) = [0.2589743659, 0.2589745694]
```

```
Permutation: 0 2 1 3 4, cycles: (0)(1,2)(3)(4)
Orthogonal transformation: {
{[0.9999999821, 1.000000018],[0, 0],[0, 0]},
{[-1.422525305e-07, 1.422525305e-07],[0.9999999754, 1.000000025],[-0,
    0]},
{[-0, 0],[-0, 0],[-1.000000042, -0.9999999575]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q1
   ]
```

```
Permutation: 1 2 0 3 4, cycles: (0,1,2)(3)(4)
Orthogonal transformation: {
{[0.9999999821, 1.000000018],[0, 0],[0, 0]},
{[-2.253570541e-07, 2.253570541e-07],[-0.5000003083,
    -0.4999996917],[0.8660251095, 0.866025698]},
{[0, 0],[-0.8660257135, -0.8660250941],[-0.5000003172,
    -0.4999996828]}
}
det(R) = 1
Rotation axis: 0-q3-q4
Rotation angle = 2*Pi/3
```

```
Permutation: 1 0 2 3 4, cycles: (0,1)(2)(3)(4)
Orthogonal transformation: {
{[0.9999999821, 1.000000018],[0, 0],[0, 0]},
{[-2.253570541e-07, 2.253570541e-07],[-0.5000003083,
    -0.4999996917],[0.8660251095, 0.866025698]},
{[-0, -0],[0.8660250941, 0.8660257135],[0.4999996828, 0.5000003172]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q1, q0
   ]
```

```
Permutation: 2 0 1 3 4, cycles: (0,2,1)(3)(4)
Orthogonal transformation: {
{[0.9999999821, 1.000000018],[0, 0],[0, 0]},
{[-2.227628776e-07, 2.227628776e-07],[-0.500000314,
```

```
    −0.499999686],[−0.866025704, −0.8660251036]},
{[−0, 0],[0.8660250881, 0.8660257195],[−0.500000323, −0.4999996771]}
}
det(R) = 1
Rotation axis: 0−q3−q4
Rotation angle = 2∗Pi/3
```

```
Permutation: 2 1 0 3 4, cycles: (0,2)(1)(3)(4)
Orthogonal transformation: {
{[0.9999999821, 1.000000018],[0, 0],[0, 0]},
{[−2.227628776e−07, 2.227628776e−07],[−0.500000314,
    −0.499999686],[−0.866025704, −0.8660251036]},
{[−0, 0],[−0.8660257195, −0.8660250881],[0.4999996771, 0.500000323]}
}
det(R) = −1
Reflection with respect to the bisecting plane of the segment [q2, q0
    ]
```

```
Permutation: 0 2 1 4 3, cycles: (0)(1,2)(3,4)
Orthogonal transformation: {
{[−1.000000596, −0.999999404],[−4.192347687e−07, 4.192347691e
    −07],[−2.319231897e−07, 2.319231904e−07]},
{[−5.614876417e−07, 5.61487642e−07],[0.9999999754,
    1.000000025],[−1.137261074e−13, 1.137261074e−13]},
{[−2.319231961e−07, 2.319231954e−07],[−2.439481805e−13, 2.439481805e
    −13],[−1.000000621, −0.9999993794]}
}
det(R) = 1
Rotation axis: 0−q0
Rotation angle = 2∗Pi/2
```

```
Permutation: 0 1 2 4 3, cycles: (0)(1)(2)(3,4)
Orthogonal transformation: {
{[−1.000000596, −0.999999404],[−4.192347687e−07, 4.192347691e
    −07],[−2.319231897e−07, 2.319231904e−07]},
{[−5.614876417e−07, 5.61487642e−07],[0.9999999754,
    1.000000025],[−1.137261074e−13, 1.137261074e−13]},
{[−2.319231954e−07, 2.319231961e−07],[−2.439481805e−13, 2.439481805e
    −13],[0.9999993794, 1.000000621]}
```

```
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q3
    ]
```

```
Permutation: 1 0 2 4 3, cycles: (0,1)(2)(3,4)
Orthogonal transformation: {
{[-1.000000596, -0.999999404],[-4.192347687e-07, 4.192347691e
    -07],[-2.319231897e-07, 2.319231904e-07]},
{[-6.35826385e-07, 6.358263855e-07],[-0.5000003083,
    -0.4999996917],[0.8660251095, 0.866025698]},
{[-4.790297496e-07, 4.790297502e-07],[0.8660245933,
    0.8660262142],[0.4999993937, 0.5000006063]}
}
det(R) = 1
Rotation axis: 0-q2
Rotation angle = 2*Pi/2
```

```
Permutation: 1 2 0 4 3, cycles: (0,1,2)(3,4)
Orthogonal transformation: {
{[-1.000000596, -0.999999404],[-4.192347687e-07, 4.192347691e
    -07],[-2.319231897e-07, 2.319231904e-07]},
{[-6.35826385e-07, 6.358263855e-07],[-0.5000003083,
    -0.4999996917],[0.8660251095, 0.866025698]},
{[-4.790297502e-07, 4.790297496e-07],[-0.8660262142,
    -0.8660245933],[-0.5000006063, -0.4999993937]}
}
det(R) = -1
Rotation angle = 2*Pi/3 or Pi/3
```

```
Permutation: 2 1 0 4 3, cycles: (0,2)(1)(3,4)
Orthogonal transformation: {
{[-1.000000596, -0.999999404],[-4.192347687e-07, 4.192347691e
    -07],[-2.319231897e-07, 2.319231904e-07]},
{[-6.332322115e-07, 6.332322107e-07],[-0.500000314,
    -0.499999686],[-0.866025704, -0.8660251036]},
{[-4.790297537e-07, 4.790297538e-07],[-0.8660262202,
    -0.8660245874],[0.499999388, 0.500000612]}
}
```

```
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/2
```

```
Permutation: 2 0 1 4 3, cycles: (0,2,1)(3,4)
Orthogonal transformation: {
{[-1.000000596, -0.999999404],[-4.192347687e-07, 4.192347691e
   -07],[-2.319231897e-07, 2.319231904e-07]},
{[-6.332322115e-07, 6.332322107e-07],[-0.500000314,
   -0.499999686],[-0.866025704, -0.8660251036]},
{[-4.790297538e-07, 4.790297537e-07],[0.8660245874,
   0.8660262202],[-0.500000612, -0.499999388]}
}
det(R) = -1
Rotation angle = 2*Pi/3 or Pi/3

Number of non-trivial symmetries = 11
```

```
position 16
```

```
i: 0 X: [0.2010197173, 0.20101974] Y: [0.6186750913, 0.6186751277] Z:
    [0, 0]
i: 1 X: [0.2010197195, 0.2010197378] Y: [-0.6186751186,
   -0.6186751004] Z: [-9.079786861e-09, 9.079786861e-09]
i: 2 X: [-0.5262764984, -0.5262764656] Y: [-0.3823622568,
   -0.3823622345] Z: [-2.707019441e-09, 2.707019441e-09]
i: 3 X: [0.6505134978, 0.6505135156] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.5262765277, -0.5262764363] Y: [0.3823622072,
   0.3823622841] Z: [-1.17868063e-08, 1.17868063e-08]
Distances from 0:
0:    [0.6505134859, 0.6505135275]
1:    [0.6505134952, 0.6505135182]
2:    [0.6505134869, 0.6505135266]
3:    [0.6505134978, 0.6505135156]
4:    [0.6505134471, 0.6505135663]

U = [0.423167803, 0.4231678419], I = [0.423167791, 0.4231678538], U*(
   I)^(1/2)/(M)^(5/2) = [0.2752763612, 0.2752764069]
planar solution no 2
```

```
position 19
=============================================================================

i: 0 X: [-0.2807231364, -0.2807231294] Y: [0.71439928, 0.7143992831]
   Z: [0, 0]
i: 1 X: [0.0987657089, 0.0987657124] Y: [0.1449272681, 0.1449272724]
   Z: [-6.914099245e-15, 6.914099245e-15]
i: 2 X: [0.07352265296, 0.07352265594] Y: [-0.6793126291,
   -0.6793126276] Z: [-4.484963588e-14, 4.484963588e-14]
i: 3 X: [0.7675752795, 0.7675752809] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.6591405198, -0.659140505] Y: [-0.1800139279,
   -0.180013919] Z: [-5.176373513e-14, 5.176373513e-14]
Distances from 0:
0:    [0.7675752775, 0.7675752829]
1:    [0.175381237, 0.1753812426]
2:    [0.6832797572, 0.6832797589]
3:    [0.7675752795, 0.7675752809]
4:    [0.6832797497, 0.6832797664]

U = [0.4285689283, 0.4285689342], I = [0.4285689275, 0.428568935], U
   *(I)^(1/2)/(M)^(5/2) = [0.2805634034, 0.2805634098]
planar solution no 3
=============================================================================

position 23
=============================================================================

i: 0 X: [-0.1908733047, -0.1896212797] Y: [0.6717212263,
   0.6721860411] Z: [0, 0]
i: 1 X: [0.3048605303, 0.3052686338] Y: [-0.02432869769,
   -0.02272999581] Z: [-3.146187888e-06, 3.146187888e-06]
i: 2 X: [-0.2477212262, -0.2471814128] Y: [-0.180640774,
   -0.1792807389] Z: [-3.056925644e-06, 3.056925644e-06]
i: 3 X: [0.8934851548, 0.8937625509] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.7622284922, -0.7597511542] Y: [-0.4701753064,
   -0.4667517545] Z: [-6.203113532e-06, 6.203113532e-06]
Distances from 0:
0:    [0.6979725177, 0.6987608263]
1:    [0.3057067151, 0.3062365496]
2:    [0.305352639, 0.3065891309]
3:    [0.8934851548, 0.8937625509]
4:    [0.8916720342, 0.8955764027]

U = [0.4536666379, 0.4551677045], I = [0.4534514407, 0.4553826005], U
   *(I)^(1/2)/(M)^(5/2) = [0.3054936842, 0.3071564619]
planar solution no 4
=============================================================================
```

```
position 26
```

```
i: 0 X: [-0.2960110483, -0.2959795676] Y: [0.6405745668,
   0.6405895356] Z: [0, 0]
i: 1 X: [-0.2960191907, -0.2959714252] Y: [-0.3203141202,
   -0.320267931] Z: [0.5547436272, 0.5547770319]
i: 2 X: [0.1100434869, 0.1100748042] Y: [-1.024974008e-05,
   1.024974008e-05] Z: [-1.623853313e-05, 1.623853313e-05]
i: 3 X: [0.7779185156, 0.777935041] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.2960588525, -0.2959317634] Y: [-0.3203318543,
   -0.3202501969] Z: [-0.5547932704, -0.5547273887]
Distances from 0:
0:     [0.7056484111, 0.7056752042]
1:     [0.705628177, 0.7056954385]
2:     [0.1100434869, 0.1100748058]
3:     [0.7779185156, 0.777935041]
4:     [0.7055907263, 0.7057328913]

U = [0.4222078073, 0.422255735], I = [0.4221951726, 0.4222683701], U
   *(I)^(1/2)/(M)^(5/2) = [0.2743360565, 0.2743909812]
```

```
Permutation: 0 4 2 3 1, cycles: (0)(1,4)(2)(3)
Orthogonal transformation: {
{[0.9999787573, 1.000021243],[0, 0],[0, 0]},
{[-6.877485408e-05, 6.87777761e-05],[0.9999766305, 1.000023368],[0,
   0]},
{[-0, 0],[-0, 0],[-1.000044611, -0.9999553883]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q1
   ]
```

```
Permutation: 1 4 2 3 0, cycles: (0,1,4)(2)(3)
Orthogonal transformation: {
{[0.9999787573, 1.000021243],[0, 0],[0, 0]},
{[-9.41992562e-05, 9.420325842e-05],[-0.500056358,
   -0.4999436442],[0.8659641622, 0.8660866462]},
{[0, 0],[-0.8661050446, -0.8659457668],[-0.5000669808,
   -0.4999330241]}
}
```

```
det(R) = 1
Rotation axis: 0-q2-q3
Rotation angle = 2*Pi/3
```

```
Permutation: 1 0 2 3 4, cycles: (0,1)(2)(3)(4)
Orthogonal transformation: {
{[0.9999787573, 1.000021243],[0, 0],[0, 0]},
{[-9.41992562e-05, 9.420325842e-05],[-0.500056358,
   -0.4999436442],[0.8659641622, 0.8660866462]},
{[-0, -0],[0.8659457668, 0.8661050446],[0.4999330241, 0.5000669808]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q1, q0
   ]
```

```
Permutation: 4 0 2 3 1, cycles: (0,4,1)(2)(3)
Orthogonal transformation: {
{[0.9999787573, 1.000021243],[0, 0],[0, 0]},
{[-0.0002180397904, 0.0002180490542],[-0.5001019456,
   -0.4998980577],[-0.866143002, -0.8659078022]},
{[-0, 0],[0.865889408, 0.8661614016],[-0.5001125693, -0.4998874385]}
}
det(R) = 1
Rotation axis: 0-q2-q3
Rotation angle = 2*Pi/3
```

```
Permutation: 4 1 2 3 0, cycles: (0,4)(1)(2)(3)
Orthogonal transformation: {
{[0.9999787573, 1.000021243],[0, 0],[0, 0]},
{[-0.0002180397904, 0.0002180490542],[-0.5001019456,
   -0.4998980577],[-0.866143002, -0.8659078022]},
{[-0, 0],[-0.8661614016, -0.865889408],[0.4998874385, 0.5001125693]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q0
   ]

Number of non-trivial symmetries = 5
```

---

position 27

```
i: 0 X: [-0.2422221073, -0.2422220991] Y: [0.6851075654,
   0.6851075685] Z: [0, 0]
i: 1 X: [-0.2422221093, -0.2422220971] Y: [-0.3425537894,
   -0.3425537775] Z: [0.5933205551, 0.5933205595]
i: 2 X: [-2.39250555e-09, 2.392505112e-09] Y: [-2.896380769e-09,
   2.896380453e-09] Z: [-4.352167121e-09, 4.352166593e-09]
i: 3 X: [0.7266663087, 0.7266663106] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.2422221167, -0.2422220897] Y: [-0.3425537938,
   -0.3425537731] Z: [-0.5933205638, -0.5933205507]
Distances from 0:
0:     [0.7266663068, 0.7266663124]
1:     [0.726666303, 0.7266663163]
2:     [0, 5.749301089e-09]
3:     [0.7266663087, 0.7266663106]
4:     [0.7266662949, 0.7266663244]

U = [0.4224351355, 0.4224351454], I = [0.4224351332, 0.4224351477], U
   *(I)^(1/2)/(M)^(5/2) = [0.2745617588, 0.27456177]
```

```
Permutation: 0 4 2 3 1, cycles: (0)(1,4)(2)(3)
Orthogonal transformation: {
{[0.9999999974, 1.000000003],[0, 0],[0, 0]},
{[-1.373340937e-08, 1.373340937e-08],[0.9999999955, 1.000000004],[0,
   0]},
{[-0, 0],[-0, 0],[-1.000000007, -0.9999999929]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q1
   ]
```

```
Permutation: 1 4 2 3 0, cycles: (0,1,4)(2)(3)
Orthogonal transformation: {
{[0.9999999974, 1.000000003],[0, 0],[0, 0]},
{[-1.967558134e-08, 1.967558134e-08],[-0.5000000122,
   -0.4999999878],[0.8660253944, 0.8660254131]},
{[0, 0],[-0.8660254154, -0.8660253922],[-0.5000000135,
   -0.4999999865]}
}
```

```
det(R) = 1
Rotation axis: 0-q2-q3
Rotation angle = 2*Pi/3
```

```
Permutation: 1 0 2 3 4, cycles: (0,1)(2)(3)(4)
Orthogonal transformation: {
{[0.9999999974, 1.000000003],[0, 0],[0, 0]},
{[-1.967558134e-08, 1.967558134e-08],[-0.5000000122,
   -0.4999999878],[0.8660253944, 0.8660254131]},
{[-0, -0],[0.8660253922, 0.8660254154],[0.4999999865, 0.5000000135]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q1, q0
   ]
```

```
Permutation: 4 0 2 3 1, cycles: (0,4,1)(2)(3)
Orthogonal transformation: {
{[0.9999999974, 1.000000003],[0, 0],[0, 0]},
{[-4.131322666e-08, 4.131322682e-08],[-0.500000023,
   -0.499999977],[-0.866025427, -0.8660253805]},
{[-0, 0],[0.8660253783, 0.8660254293],[-0.5000000243, -0.4999999757]}
}
det(R) = 1
Rotation axis: 0-q2-q3
Rotation angle = 2*Pi/3
```

```
Permutation: 4 1 2 3 0, cycles: (0,4)(1)(2)(3)
Orthogonal transformation: {
{[0.9999999974, 1.000000003],[0, 0],[0, 0]},
{[-4.131322666e-08, 4.131322682e-08],[-0.500000023,
   -0.499999977],[-0.866025427, -0.8660253805]},
{[-0, 0],[-0.8660254293, -0.8660253783],[0.4999999757, 0.5000000243]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q0
   ]
```

```
Permutation: 1 3 2 0 4, cycles: (0,1,3)(2)(4)
Orthogonal transformation: {
{[-0.3333333402, -0.3333333264],[0.9428090358, 0.9428090473],[0, 0]},
{[-0.4714045447, -0.4714044969],[-0.1666666953,
   -0.166666638],[0.8660253875, 0.86602542]},
{[0.8164965606, 0.8164966012],[0.2886751232,
   0.288675146],[0.499999964, 0.500000036]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/3
```

```
Permutation: 1 4 2 0 3, cycles: (0,1,4,3)(2)
Orthogonal transformation: {
{[-0.3333333402, -0.3333333264],[0.9428090358, 0.9428090473],[0, 0]},
{[-0.4714045447, -0.4714044969],[-0.1666666953,
   -0.166666638],[0.8660253875, 0.86602542]},
{[-0.8164966012, -0.8164965606],[-0.288675146,
   -0.2886751232],[-0.500000036, -0.499999964]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 3 4 2 0 1, cycles: (0,3)(1,4)(2)
Orthogonal transformation: {
{[-0.3333333402, -0.3333333264],[0.9428090358, 0.9428090473],[0, 0]},
{[0.9428090265, 0.9428090566],[0.3333333209, 0.3333333457],[0, 0]},
{[-0, 0],[0, 0],[-1.000000026, -0.999999974]}
}
det(R) = 1
Rotation axis: 0-q2
Rotation angle = 2*Pi/2
```

```
Permutation: 3 1 2 0 4, cycles: (0,3)(1)(2)(4)
Orthogonal transformation: {
{[-0.3333333402, -0.3333333264],[0.9428090358, 0.9428090473],[0, 0]},
{[0.9428090265, 0.9428090566],[0.3333333209, 0.3333333457],[0, 0]},
{[-0, 0],[-0, -0],[0.999999974, 1.000000026]}
```

```
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q0
    ]
```

```
Permutation: 4 1 2 0 3, cycles: (0,4,3)(1)(2)
Orthogonal transformation: {
{[-0.3333333402, -0.3333333264],[0.9428090358, 0.9428090473],[0, 0]},
{[-0.4714045657, -0.4714044759],[-0.1666667134,
    -0.1666666199],[-0.8660254391, -0.8660253684]},
{[-0.8164966192, -0.8164965426],[-0.2886751523,
    -0.2886751168],[0.4999999382, 0.5000000618]}
}
det(R) = 1
Rotation axis: 0-q1-q2
Rotation angle = 2*Pi/3
```

```
Permutation: 4 3 2 0 1, cycles: (0,4,1,3)(2)
Orthogonal transformation: {
{[-0.3333333402, -0.3333333264],[0.9428090358, 0.9428090473],[0, 0]},
{[-0.4714045657, -0.4714044759],[-0.1666667134,
    -0.1666666199],[-0.8660254391, -0.8660253684]},
{[0.8164965426, 0.8164966192],[0.2886751168,
   0.2886751523],[-0.5000000618, -0.4999999382]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 0 4 2 1 3, cycles: (0)(1,4,3)(2)
Orthogonal transformation: {
{[-0.3333333448, -0.3333333219],[-0.4714045332,
    -0.4714045083],[0.8164965705, 0.8164965914]},
{[-0.4714045499, -0.4714044917],[0.8333332953,
   0.8333333714],[0.2886751073, 0.2886751619]},
{[-0.8164966372, -0.8164965247],[-0.2886751757,
    -0.2886750935],[-0.5000000418, -0.4999999582]}
}
det(R) = 1
Rotation axis: 0-q0-q2
```

```
Rotation angle = 2*Pi/3
```

```
Permutation: 0 3 2 1 4, cycles: (0)(1,3)(2)(4)
Orthogonal transformation: {
{[-0.3333333448, -0.3333333219],[-0.4714045332,
   -0.4714045083],[0.8164965705, 0.8164965914]},
{[-0.4714045499, -0.4714044917],[0.8333332953,
   0.8333333714],[0.2886751073, 0.2886751619]},
{[0.8164965247, 0.8164966372],[0.2886750935,
   0.2886751757],[0.4999999582, 0.5000000418]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q1
   ]
```

```
Permutation: 3 0 2 1 4, cycles: (0,3,1)(2)(4)
Orthogonal transformation: {
{[-0.3333333448, -0.3333333219],[-0.4714045332,
   -0.4714045083],[0.8164965705, 0.8164965914]},
{[0.942809018, 0.9428090652],[-0.1666666795,
   -0.1666666539],[0.2886751163, 0.2886751529]},
{[-2.440625252e-08, 2.440625252e-08],[0.8660253653,
   0.8660254423],[0.499999971, 0.500000029]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/3
```

```
Permutation: 3 4 2 1 0, cycles: (0,3,1,4)(2)
Orthogonal transformation: {
{[-0.3333333448, -0.3333333219],[-0.4714045332,
   -0.4714045083],[0.8164965705, 0.8164965914]},
{[0.942809018, 0.9428090652],[-0.1666666795,
   -0.1666666539],[0.2886751163, 0.2886751529]},
{[-2.440625252e-08, 2.440625252e-08],[-0.8660254423,
   -0.8660253653],[-0.500000029, -0.499999971]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 4 3 2 1 0, cycles: (0,4)(1,3)(2)
Orthogonal transformation: {
{[-0.3333333448, -0.3333333219],[-0.4714045332,
   -0.4714045083],[0.8164965705, 0.8164965914]},
{[-0.4714045913, -0.4714044502],[-0.6666667523,
   -0.666666581],[-0.5773503564, -0.577350182]},
{[0.8164964557, 0.8164967061],[-0.5773503674,
   -0.577350171],[-7.530907645e-08, 7.530907578e-08]}
}
det(R) = 1
Rotation axis: 0-q2
Rotation angle = 2*Pi/2
```

```
Permutation: 4 0 2 1 3, cycles: (0,4,3,1)(2)
Orthogonal transformation: {
{[-0.3333333448, -0.3333333219],[-0.4714045332,
   -0.4714045083],[0.8164965705, 0.8164965914]},
{[-0.4714045913, -0.4714044502],[-0.6666667523,
   -0.666666581],[-0.5773503564, -0.577350182]},
{[-0.8164967061, -0.8164964557],[0.577350171,
   0.5773503674],[-7.530907578e-08, 7.530907645e-08]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 0 3 2 4 1, cycles: (0)(1,3,4)(2)
Orthogonal transformation: {
{[-0.3333333587, -0.333333308],[-0.4714045446,
   -0.471404497],[-0.8164966065, -0.8164965554]},
{[-0.4714045696, -0.471404472],[0.8333332669,
   0.8333333997],[-0.2886751863, -0.2886750829]},
{[0.8164964742, 0.8164966877],[0.2886750581,
   0.2886752111],[-0.5000000775, -0.4999999225]}
}
det(R) = 1
Rotation axis: 0-q0-q2
Rotation angle = 2*Pi/3
```

```
Permutation: 0 1 2 4 3, cycles: (0)(1)(2)(3,4)
Orthogonal transformation: {
{[-0.3333333587, -0.333333308],[-0.4714045446,
   -0.471404497],[-0.8164966065, -0.8164965554]},
{[-0.4714045696, -0.471404472],[0.8333332669,
   0.8333333997],[-0.2886751863, -0.2886750829]},
{[-0.8164966877, -0.8164964742],[-0.2886752111,
   -0.2886750581],[0.4999999225, 0.5000000775]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q3
   ]
```

```
Permutation: 1 0 2 4 3, cycles: (0,1)(2)(3,4)
Orthogonal transformation: {
{[-0.3333333587, -0.333333308],[-0.4714045446,
   -0.471404497],[-0.8164966065, -0.8164965554]},
{[-0.4714045923, -0.4714044493],[-0.6666667596,
   -0.6666665738],[0.5773501698, 0.5773503686]},
{[-0.8164967344, -0.8164964274],[0.577350151,
   0.5773503874],[-9.280687685e-08, 9.28068776e-08]}
}
det(R) = 1
Rotation axis: 0-q2
Rotation angle = 2*Pi/2
```

```
Permutation: 1 3 2 4 0, cycles: (0,1,3,4)(2)
Orthogonal transformation: {
{[-0.3333333587, -0.333333308],[-0.4714045446,
   -0.471404497],[-0.8164966065, -0.8164965554]},
{[-0.4714045923, -0.4714044493],[-0.6666667596,
   -0.6666665738],[0.5773501698, 0.5773503686]},
{[0.8164964274, 0.8164967344],[-0.5773503874,
   -0.577350151],[-9.28068776e-08, 9.280687685e-08]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 3 1 2 4 0, cycles: (0,3,4)(1)(2)
Orthogonal transformation: {
{[-0.3333333587, -0.333333308],[-0.4714045446,
   -0.471404497],[-0.8164966065, -0.8164965554]},
{[0.9428089929, 0.9428090902],[-0.1666666931,
   -0.1666666402],[-0.2886751749, -0.2886750943]},
{[-5.175196396e-08, 5.175196396e-08],[-0.8660254884,
   -0.8660253192],[0.4999999416, 0.5000000584]}
}
det(R) = 1
Rotation axis: 0-q1-q2
Rotation angle = 2*Pi/3
```

```
Permutation: 3 0 2 4 1, cycles: (0,3,4,1)(2)
Orthogonal transformation: {
{[-0.3333333587, -0.333333308],[-0.4714045446,
   -0.471404497],[-0.8164966065, -0.8164965554]},
{[0.9428089929, 0.9428090902],[-0.1666666931,
   -0.1666666402],[-0.2886751749, -0.2886750943]},
{[-5.175196396e-08, 5.175196396e-08],[0.8660253192,
   0.8660254884],[-0.5000000584, -0.4999999416]}
}
det(R) = -1
Rotation angle = 2*Pi/4

Number of non-trivial symmetries = 23
```

```
position 28
```

```
i: 0 X: [0.03839241555, 0.03839242439] Y: [0.6391624735,
   0.6391624803] Z: [0, 0]
i: 1 X: [-0.1535697203, -0.1535696395] Y: [-0.1446220794,
   -0.1446219967] Z: [0.5906203379, 0.5906203426]
i: 2 X: [0.03839241456, 0.03839242538] Y: [-0.5668515008,
   -0.566851415] Z: [-0.2953102498, -0.2953100905]
i: 3 X: [0.6403144905, 0.6403144953] Y: [0, 0] Z: [0, 0]
i: 4 X: [-0.5635297056, -0.5635296003] Y: [0.0723109314,
   0.07231110665] Z: [-0.2953102521, -0.2953100881]
```

```
Distances from 0:
0:     [0.6403144892, 0.6403144966]
1:     [0.6271614941, 0.6271615374]
2:     [0.6403144179, 0.6403145679]
3:     [0.6403144905, 0.6403144953]
4:     [0.6403143989, 0.6403145869]

U = [0.4066683988, 0.4066684676], I = [0.4066683829, 0.4066684835], U
    *(I)^(1/2)/(M)^(5/2) = [0.2593346995, 0.2593347755]
```

```
Permutation: 2 1 0 3 4, cycles: (0,2)(1)(3)(4)
Orthogonal transformation: {
{[0.9999999924, 1.000000008],[0, 0],[0, 0]},
{[-1.78264215e-08, 1.782642125e-08],[-0.8868661531,
    -0.8868658113],[-0.4620269415, -0.4620265842]},
{[-0, 0],[-0.462026945, -0.4620265807],[0.8868658046, 0.8868661599]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q0
    ]
```

```
Permutation: 3 1 4 0 2, cycles: (0,3)(1)(2,4)
Orthogonal transformation: {
{[0.05995868555, 0.05995870004],[0.998200848, 0.9982008702],[0, 0]},
{[0.9982008493, 0.9982008689],[-0.05995870124, -0.05995868434],[-0,
    0]},
{[-0, 0],[-0, 0],[0.9999999782, 1.000000022]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q2
    ]
```

```
Permutation: 4 1 3 0 2, cycles: (0,4,2,3)(1)
Orthogonal transformation: {
{[0.05995868555, 0.05995870004],[0.998200848, 0.9982008702],[0, 0]},
{[-0.885270615, -0.8852701558],[0.05317502978,
    0.05317562018],[-0.4620269631, -0.4620265626]},
{[-0.4611957166, -0.4611953066],[0.02770250538,
    0.02770253609],[0.8868657251, 0.8868662393]}
}
```

```
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/4
```

```
Permutation: 3 1 4 2 0, cycles: (0,3,2,4)(1)
Orthogonal transformation: {
{[0.05995867733, 0.05995870826],[-0.8852705561,
   -0.8852702147],[-0.46119569, -0.4611953332]},
{[0.998200846, 0.9982008722],[0.05317530041,
   0.05317534954],[0.02770250256, 0.02770253891]},
{[-4.163200483e-08, 4.163200484e-08],[-0.4620269484,
   -0.4620265772],[0.886865798, 0.8868661665]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/4
```

```
Permutation: 4 1 3 2 0, cycles: (0,4)(1)(2,3)
Orthogonal transformation: {
{[0.05995867733, 0.05995870826],[-0.8852705561,
   -0.8852702147],[-0.46119569, -0.4611953332]},
{[-0.8852707338, -0.885270037],[0.1663088827,
   0.1663098028],[-0.434324641, -0.4343238431]},
{[-0.4611961808, -0.4611948424],[-0.4343245913,
   -0.4343238929],[0.7737314748, 0.7737324541]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q2
   ]
```

```
Permutation: 0 1 2 4 3, cycles: (0)(1)(2)(3,4)
Orthogonal transformation: {
{[-0.8800828258, -0.880082403],[0.1129303203,
   0.1129306272],[-0.4611957074, -0.4611953158]},
{[0.1129302957, 0.1129306517],[0.9932165427,
   0.9932167217],[0.02770242773, 0.02770261374]},
{[-0.4611957621, -0.4611952611],[0.02770232882,
   0.02770271265],[0.8868656561, 0.8868663084]}
}
```

```
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q3
    ]

-------------------------------------------------------------------------------


Permutation: 2 1 0 4 3, cycles: (0,2)(1)(3,4)
Orthogonal transformation: {
{[-0.8800828258, -0.880082403],[0.1129303203,
   0.1129306272],[-0.4611957074, -0.4611953158]},
{[0.1129301495, 0.112930798],[-0.8936496891,
   -0.8936490109],[-0.4343246328, -0.4343238514]},
{[-0.4611959537, -0.4611950695],[-0.4343248494,
   -0.4343236348],[0.7737314231, 0.7737325058]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/2


Number of non-trivial symmetries = 7

Number of different cc = 9
-------------------------------------------------------


real 1293.86
user 12429.33
sys 4524.13
```

A.3 Six bodies

```
SPATIAL CASE
=============================================================
Number of bodies = 6
EQUAL MASSES

Accuracy eps = 1e-05, bias = 0.01, biasCute = 0.001
MAX_ASYNCH_DEPTH = 512
-----------------------------------------------------


Input data:
i: 0 X: [-5.005, 5.002] Y: [-0.005, 5.002] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 1 X: [-5.005, 5.002] Y: [-5.005, 5.002] Z: [-0.005, 5.002] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [-5.005, 5.002] Y: [-5.005, 5.002] Z: [-5.005, 5.002] mass:
   [0.1666666667, 0.1666666667]
```

```
i: 3 X: [-5.005, 5.002] Y: [-5.005, 5.002] Z: [-5.005, 5.002] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.495, 5.002] Y: [0, 0] Z: [0, 0] mass: [0.1666666667,
   0.1666666667]
i: 5 X: [-5, 5] Y: [-5, 5] Z: [-5, 5] mass: [0.1666666667,
   0.1666666667]


The number of zeros in the method: 80
The number of UNDECIDED cubes: 6

Tests usage:
checkAprioriBounds -- 28571
clusterTest -- 370510753
distanceTest -- 37942708844
checkZero -- 129980359139
krawczyk: methodFailed  -- 26510453376
krawczyk: zeroIside -- 80
krawczyk: no zero inside -- 24760985768
U = I -- 112604704
improvement in clusterTest -- 109675897
improvement in U = I Test -- 92099658

Number of checked boxes = 386334395729

The number of CC found in the search phase 80

Different CC:
================================================================================

position 0
================================================================================


i: 0 X: [-1.13640698e-05, 1.13640698e-05] Y: [0.6521550685,
   0.6521602589] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-1.39360911e-05, 1.39360911e-05] Y: [-1.168875518e-05,
   1.168875518e-05] Z: [0.6521551354, 0.6521601921] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [-1.173478202e-05, 1.173478202e-05] Y: [-0.6521604772,
   -0.6521548503] Z: [-1.585052032e-05, 1.585052032e-05] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [-1.408311335e-05, 1.408311335e-05] Y: [-1.18658871e-05,
   1.18658871e-05] Z: [-0.652160289, -0.6521550384] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.6521560322, 0.6521592952] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.6522104133, -0.6521049142] Y: [-2.896329712e-05,
```

```
    2.896329712e-05] Z: [-2.100418652e-05, 2.100418652e-05] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:      [0.6521550685, 0.652160259]
1:      [0.6521551354, 0.6521601923]
2:      [0.6521548503, 0.6521604775]
3:      [0.6521550384, 0.6521602893]
4:      [0.6521560322, 0.6521592952]
5:      [0.6521049142, 0.6522104143]

U = [0.4252960718, 0.4253231661], I = [0.425295501, 0.425323737], U*(
    I)^(1/2)/(M)^(5/2) = [0.2773554893, 0.2773823662]
```

```
Permutation: 0 3 2 1 4 5, cycles: (0)(1,3)(2)(4)(5)
Orthogonal transformation: {
{[0.9999949966, 1.000005003],[0, 0],[0, 0]},
{[-3.485099544e-05, 3.485099544e-05],[0.9999920406, 1.000007959],[-0,
     0]},
{[-0, 0],[-0, 0],[-1.000012962, -0.9999870373]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q1
    ]
```

```
Permutation: 1 2 3 0 4 5, cycles: (0,1,2,3)(4)(5)
Orthogonal transformation: {
{[0.9999949966, 1.000005003],[0, 0],[0, 0]},
{[-4.273879042e-05, 4.273879042e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922451, 1.000007754]},
{[-0, 0],[-1.000012757, -0.9999872418],[-1.792336367e-05, 1.792336367
    e-05]}
}
det(R) = 1
Rotation axis: 0-q4-q5
Rotation angle = 2*Pi/4
```

```
Permutation: 1 0 3 2 4 5, cycles: (0,1)(2,3)(4)(5)
Orthogonal transformation: {
{[0.9999949966, 1.000005003],[0, 0],[0, 0]},
```

```
{[-4.273879042e-05, 4.273879042e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922451, 1.000007754]},
{[-0, 0],[0.9999872418, 1.000012757],[-1.792336367e-05, 1.792336367e
    -05]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q2
    ]
```

```
Permutation: 2 3 0 1 4 5, cycles: (0,2)(1,3)(4)(5)
Orthogonal transformation: {
{[0.9999949966, 1.000005003],[0, 0],[0, 0]},
{[-3.598789684e-05, 3.598789684e-05],[-1.000008628,
    -0.9999913709],[-2.430484157e-05, 2.430484157e-05]},
{[-0, 0],[-2.430496318e-05, 2.430496318e-05],[-1.000013632,
    -0.9999863676]}
}
det(R) = 1
Rotation axis: 0-q4-q5
Rotation angle = 2*Pi/2
```

```
Permutation: 2 1 0 3 4 5, cycles: (0,2)(1)(3)(4)(5)
Orthogonal transformation: {
{[0.9999949966, 1.000005003],[0, 0],[0, 0]},
{[-3.598789684e-05, 3.598789684e-05],[-1.000008628,
    -0.9999913709],[-2.430484157e-05, 2.430484157e-05]},
{[-0, 0],[-2.430496318e-05, 2.430496318e-05],[0.9999863676,
    1.000013632]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q0
    ]
```

```
Permutation: 3 0 1 2 4 5, cycles: (0,3,2,1)(4)(5)
Orthogonal transformation: {
{[0.9999949966, 1.000005003],[0, 0],[0, 0]},
{[-4.318968031e-05, 4.318968031e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919478]},
{[-0, 0],[0.9999869445, 1.000013055],[-1.819497784e-05, 1.819497784e
    -05]}
```

```
}
det(R) = 1
Rotation axis: 0-q4-q5
Rotation angle = 2*Pi/4
```

```
Permutation: 3 2 1 0 4 5, cycles: (0,3)(1,2)(4)(5)
Orthogonal transformation: {
{[0.9999949966, 1.000005003],[0, 0],[0, 0]},
{[-4.318968031e-05, 4.318968031e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919478]},
{[-0, 0],[-1.000013055, -0.9999869445],[-1.819497784e-05, 1.819497784
    e-05]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q1
    ]
```

```
Permutation: 1 4 3 5 0 2, cycles: (0,1,4)(2,3,5)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[-2.136960062e-05, 2.136960062e-05],[-3.584720566e-05, 3.584720566e
    -05],[0.9999922453, 1.000007754]},
{[0.9999842865, 1.000015713],[-1.742554565e-05, 1.742554565e
    -05],[-2.137039535e-05, 2.137039535e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 1 5 3 4 0 2, cycles: (0,1,5,2,3,4)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[-2.136960062e-05, 2.136960062e-05],[-3.584720566e-05, 3.584720566e
    -05],[0.9999922453, 1.000007754]},
{[-1.000015713, -0.9999842865],[-1.742554565e-05, 1.742554565e
    -05],[-2.137039535e-05, 2.137039535e-05]}
}
```

```
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 3 5 1 4 0 2, cycles: (0,3,4)(1,5,2)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[-2.159504917e-05, 2.159504917e-05],[-3.639043954e-05, 3.639043954e
    -05],[-1.000008051, -0.999991948]},
{[-1.00001601, -0.9999839891],[-1.742555083e-05, 1.742555083e
    -05],[-2.159585516e-05, 2.159585516e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 3 4 1 5 0 2, cycles: (0,3,5,2,1,4)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[-2.159504917e-05, 2.159504917e-05],[-3.639043954e-05, 3.639043954e
    -05],[-1.000008051, -0.999991948]},
{[0.9999839891, 1.00001601],[-1.742555083e-05, 1.742555083e
    -05],[-2.159585516e-05, 2.159585516e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 4 3 5 1 0 2, cycles: (0,4)(1,3)(2,5)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[0.9999949959, 1.000005004],[-1.742563641e-05, 1.742563641e-05],[-0,
     0]},
{[-0, 0],[-0, 0],[-1.000012963, -0.9999870367]}
}
det(R) = 1
```

```
Rotation angle = 2*Pi/2
```

```
Permutation: 4 1 5 3 0 2, cycles: (0,4)(1)(2,5)(3)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[0.9999949959, 1.000005004],[-1.742563641e-05, 1.742563641e-05],[-0,
     0]},
{[-0, 0],[-0, 0],[0.9999870367, 1.000012963]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q2
    ]
```

```
Permutation: 5 1 4 3 0 2, cycles: (0,5,2,4)(1)(3)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[-1.000161785, -0.9998382355],[-0.0001062592514,
    0.0001062592514],[-3.220982711e-05, 3.220982711e-05]},
{[-3.221008347e-05, 3.221008347e-05],[-5.612694607e-10, 5.612694607e
    -10],[0.999830276, 1.000169747]}
}
det(R) = 1
Rotation axis: 0-q1-q3
Rotation angle = 2*Pi/4
```

```
Permutation: 5 3 4 1 0 2, cycles: (0,5,2,4)(1,3)
Orthogonal transformation: {
{[-1.742541054e-05, 1.742541054e-05],[0.9999920411, 1.000007959],[0,
    0]},
{[-1.000161785, -0.9998382355],[-0.0001062592514,
    0.0001062592514],[-3.220982711e-05, 3.220982711e-05]},
{[-3.221008347e-05, 3.221008347e-05],[-5.612694607e-10, 5.612694607e
    -10],[-1.000169747, -0.999830276]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 0 5 2 4 1 3, cycles: (0)(1,5,3,4)(2)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[-1.742579356e-05, 1.742579356e-05],[0.9999920403,
    1.000007959],[-1.7923928e-05, 1.7923928e-05]},
{[-1.000015714, -0.9999842858],[-1.74263117e-05, 1.74263117e
    -05],[-2.13697707e-05, 2.13697707e-05]}
}
det(R) = 1
Rotation axis: 0-q0-q2
Rotation angle = 2*Pi/4
```

```
Permutation: 0 4 2 5 1 3, cycles: (0)(1,4)(2)(3,5)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[-1.742579356e-05, 1.742579356e-05],[0.9999920403,
    1.000007959],[-1.7923928e-05, 1.7923928e-05]},
{[0.9999842858, 1.000015714],[-1.74263117e-05, 1.74263117e
    -05],[-2.13697707e-05, 2.13697707e-05]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q3
    ]
```

```
Permutation: 2 4 0 5 1 3, cycles: (0,2)(1,4)(3,5)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[-1.79947608e-05, 1.79947608e-05],[-1.00000863,
    -0.999991368],[-6.653401225e-05, 6.653401225e-05]},
{[0.9999836127, 1.000016385],[-1.799632211e-05, 1.799632211e
    -05],[-2.136979522e-05, 2.136979522e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 2 5 0 4 1 3, cycles: (0,2)(1,5,3,4)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[-1.79947608e-05, 1.79947608e-05],[-1.00000863,
    -0.999991368],[-6.653401225e-05, 6.653401225e-05]},
{[-1.000016385, -0.9999836127],[-1.799632211e-05, 1.799632211e
    -05],[-2.136979522e-05, 2.136979522e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 4 0 5 2 1 3, cycles: (0,4,1)(2,5,3)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[0.9999949955, 1.000005004],[-3.830095256e-10, 3.830095256e
    -10],[-2.136956091e-05, 2.136956091e-05]},
{[-7.660249908e-10, 7.660249908e-10],[0.9999872409,
    1.000012759],[-1.79233637e-05, 1.79233637e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 4 2 5 0 1 3, cycles: (0,4,1,2,5,3)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[0.9999949955, 1.000005004],[-3.830095256e-10, 3.830095256e
    -10],[-2.136956091e-05, 2.136956091e-05]},
{[-7.660249908e-10, 7.660249908e-10],[-1.000012759,
    -0.9999872409],[-1.79233637e-05, 1.79233637e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 5 2 4 0 1 3, cycles: (0,5,3)(1,2,4)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[-1.000161785, -0.9998382368],[-4.441604841e-05, 4.441604841e
    -05],[-8.579386102e-05, 8.579386102e-05]},
{[-4.441793051e-05, 4.441793051e-05],[-1.000169542,
    -0.9998304821],[-1.792712285e-05, 1.792712285e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 5 0 4 2 1 3, cycles: (0,5,3,2,4,1)
Orthogonal transformation: {
{[-2.136928829e-05, 2.136928829e-05],[-1.7923274e-05, 1.7923274e
    -05],[0.9999922458, 1.000007754]},
{[-1.000161785, -0.9998382368],[-4.441604841e-05, 4.441604841e
    -05],[-8.579386102e-05, 8.579386102e-05]},
{[-4.441793051e-05, 4.441793051e-05],[0.9998304821,
    1.000169542],[-1.792712285e-05, 1.792712285e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 1 5 3 4 2 0, cycles: (0,1,5)(2,3,4)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
    -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[-2.137004817e-05, 2.137004817e-05],[-6.01524816e-05, 6.01524816e
    -05],[0.9999922421, 1.000007756]},
{[-1.000016386, -0.9999836122],[-1.799451734e-05, 1.799451734e
    -05],[-2.137131493e-05, 2.137131493e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 1 4 3 5 2 0, cycles: (0,1,4,2,3,5)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
    -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[-2.137004817e-05, 2.137004817e-05],[-6.01524816e-05, 6.01524816e
    -05],[0.9999922421, 1.000007756]},
{[0.9999836122, 1.000016386],[-1.799451734e-05, 1.799451734e
    -05],[-2.137131493e-05, 2.137131493e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 3 4 1 5 2 0, cycles: (0,3,5)(1,4,2)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
    -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[-2.159549688e-05, 2.159549688e-05],[-6.06957232e-05, 6.06957232e
    -05],[-1.000008053, -0.9999919447]},
{[0.9999833148, 1.000016683],[-1.799452817e-05, 1.799452817e
    -05],[-2.159677536e-05, 2.159677536e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 3 5 1 4 2 0, cycles: (0,3,4,2,1,5)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
    -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[-2.159549688e-05, 2.159549688e-05],[-6.06957232e-05, 6.06957232e
    -05],[-1.000008053, -0.9999919447]},
{[-1.000016683, -0.9999833148],[-1.799452817e-05, 1.799452817e
    -05],[-2.159677536e-05, 2.159677536e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 4 1 5 3 2 0, cycles: (0,4,2,5)(1)(3)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
    -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[0.9999949958, 1.000005004],[-1.799410368e-05, 1.799410368e
    -05],[-4.373400657e-10, 4.373400657e-10]},
{[-8.746876784e-10, 8.746876784e-10],[-2.43049632e-05, 2.43049632e
    -05],[0.999986367, 1.000013633]}
}
det(R) = 1
Rotation axis: 0-q1-q3
Rotation angle = 2*Pi/4
```

```
Permutation: 4 3 5 1 2 0, cycles: (0,4,2,5)(1,3)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
    -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[0.9999949958, 1.000005004],[-1.799410368e-05, 1.799410368e
    -05],[-4.373400657e-10, 4.373400657e-10]},
{[-8.746876784e-10, 8.746876784e-10],[-2.43049632e-05, 2.43049632e
    -05],[-1.000013633, -0.999986367]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 5 3 4 1 2 0, cycles: (0,5)(1,3)(2,4)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
    -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[-1.000161785, -0.9998382353],[-0.0001068286501,
    0.0001068286501],[-3.221134405e-05, 3.221134406e-05]},
{[-3.221421843e-05, 3.221421843e-05],[-2.430935333e-05, 2.430935333e
    -05],[-1.000170416, -0.9998296062]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 5 1 4 3 2 0, cycles: (0,5)(1)(2,4)(3)
Orthogonal transformation: {
{[-1.799385839e-05, 1.799385839e-05],[-1.000008628,
   -0.9999913714],[-2.430484157e-05, 2.430484157e-05]},
{[-1.000161785, -0.9998382353],[-0.0001068286501,
   0.0001068286501],[-3.221134405e-05, 3.221134406e-05]},
{[-3.221421843e-05, 3.221421843e-05],[-2.430935333e-05, 2.430935333e
   -05],[0.9998296062, 1.000170416]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q2
   ]
```

```
Permutation: 0 4 2 5 3 1, cycles: (0)(1,4,3,5)(2)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
   -05],[-1.000008051, -0.9999919485]},
{[-1.742580347e-05, 1.742580347e-05],[0.9999920402,
   1.000007959],[-1.819555442e-05, 1.819555442e-05]},
{[0.9999839885, 1.000016011],[-1.742633669e-05, 1.742633669e
   -05],[-2.159522105e-05, 2.159522105e-05]}
}
det(R) = 1
Rotation axis: 0-q0-q2
Rotation angle = 2*Pi/4
```

```
Permutation: 0 5 2 4 3 1, cycles: (0)(1,5)(2)(3,4)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
   -05],[-1.000008051, -0.9999919485]},
{[-1.742580347e-05, 1.742580347e-05],[0.9999920402,
   1.000007959],[-1.819555442e-05, 1.819555442e-05]},
{[-1.000016011, -0.9999839885],[-1.742633669e-05, 1.742633669e
   -05],[-2.159522105e-05, 2.159522105e-05]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q3
   ]
```

```
Permutation: 2 5 0 4 3 1, cycles: (0,2)(1,5)(3,4)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919485]},
{[-1.799477619e-05, 1.799477619e-05],[-1.00000863,
    -0.9999913679],[-6.680565343e-05, 6.680565343e-05]},
{[-1.000016682, -0.9999833153],[-1.799636372e-05, 1.799636372e
    -05],[-2.159524588e-05, 2.159524588e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 2 4 0 5 3 1, cycles: (0,2)(1,4,3,5)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919485]},
{[-1.799477619e-05, 1.799477619e-05],[-1.00000863,
    -0.9999913679],[-6.680565343e-05, 6.680565343e-05]},
{[0.9999833153, 1.000016682],[-1.799636372e-05, 1.799636372e
    -05],[-2.159524588e-05, 2.159524588e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 4 2 5 0 3 1, cycles: (0,4,3)(1,2,5)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919485]},
{[0.9999949955, 1.000005004],[-3.929156724e-10, 3.929156724e
    -10],[-2.159501403e-05, 2.159501403e-05]},
{[-7.858376717e-10, 7.858376717e-10],[-1.000013056,
    -0.9999869435],[-1.819497787e-05, 1.819497787e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 4 0 5 2 3 1, cycles: (0,4,3,2,5,1)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919485]},
{[0.9999949955, 1.000005004],[-3.929156724e-10, 3.929156724e
    -10],[-2.159501403e-05, 2.159501403e-05]},
{[-7.858376717e-10, 7.858376717e-10],[0.9999869435,
    1.000013056],[-1.819497787e-05, 1.819497787e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 5 0 4 2 3 1, cycles: (0,5,1)(2,4,3)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919485]},
{[-1.000161785, -0.9998382368],[-4.441606707e-05, 4.441606707e
    -05],[-8.60193807e-05, 8.60193807e-05]},
{[-4.441798978e-05, 4.441798978e-05],[0.9998301847,
    1.000169839],[-1.819878962e-05, 1.819878962e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 5 2 4 0 3 1, cycles: (0,5,1,2,4,3)
Orthogonal transformation: {
{[-2.159473211e-05, 2.159473211e-05],[-1.819488681e-05, 1.819488681e
    -05],[-1.000008051, -0.9999919485]},
{[-1.000161785, -0.9998382368],[-4.441606707e-05, 4.441606707e
    -05],[-8.60193807e-05, 8.60193807e-05]},
{[-4.441798978e-05, 4.441798978e-05],[-1.000169839,
    -0.9998301847],[-1.819878962e-05, 1.819878962e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/6
```

```
Permutation: 0 3 2 1 5 4, cycles: (0)(1,3)(2)(4,5)
```

```
Orthogonal transformation: {
{[-1.000161782, -0.9998382423],[-4.441508796e-05, 4.441508796e
    -05],[-3.220982708e-05, 3.220982708e-05]},
{[-7.927908709e-05, 7.927908709e-05],[0.9999920326,
    1.000007964],[-1.991973958e-09, 1.991973958e-09]},
{[-3.22100837e-05, 3.22100837e-05],[-4.545861911e-09, 4.545861911e
    -09],[-1.000169752, -0.9998302726]}
}
det(R) = 1
Rotation axis: 0-q0-q2
Rotation angle = 2*Pi/2
```

```
Permutation: 0 1 2 3 5 4, cycles: (0)(1)(2)(3)(4,5)
Orthogonal transformation: {
{[-1.000161782, -0.9998382423],[-4.441508796e-05, 4.441508796e
    -05],[-3.220982708e-05, 3.220982708e-05]},
{[-7.927908709e-05, 7.927908709e-05],[0.9999920326,
    1.000007964],[-1.991973958e-09, 1.991973958e-09]},
{[-3.22100837e-05, 3.22100837e-05],[-4.545861911e-09, 4.545861911e
    -09],[0.9998302726, 1.000169752]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q4
    ]
```

```
Permutation: 1 0 3 2 5 4, cycles: (0,1)(2,3)(4,5)
Orthogonal transformation: {
{[-1.000161782, -0.9998382423],[-4.441508796e-05, 4.441508796e
    -05],[-3.220982708e-05, 3.220982708e-05]},
{[-7.496157566e-05, 7.496157566e-05],[-1.792565395e-05, 1.792565395e
    -05],[0.9999922398, 1.000007757]},
{[-4.441600989e-05, 4.441600989e-05],[0.9998304809,
    1.000169543],[-1.793188343e-05, 1.793188343e-05]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 1 2 3 0 5 4, cycles: (0,1,2,3)(4,5)
```

```
Orthogonal transformation: {
{[-1.000161782, -0.9998382423],[-4.441508796e-05, 4.441508796e
    -05],[-3.220982708e-05, 3.220982708e-05]},
{[-7.496157566e-05, 7.496157566e-05],[-1.792565395e-05, 1.792565395e
    -05],[0.9999922398, 1.000007757]},
{[-4.441600989e-05, 4.441600989e-05],[-1.000169543,
    -0.9998304809],[-1.793188343e-05, 1.793188343e-05]}
}
det(R) = -1
Rotation angle = 2*Pi/4
```

```
Permutation: 2 1 0 3 5 4, cycles: (0,2)(1)(3)(4,5)
Orthogonal transformation: {
{[-1.000161782, -0.9998382423],[-4.441508796e-05, 4.441508796e
    -05],[-3.220982708e-05, 3.220982708e-05]},
{[-8.041697946e-05, 8.041697946e-05],[-1.000008634,
    -0.9999913628],[-2.430685196e-05, 2.430685195e-05]},
{[-3.221118476e-05, 3.221118476e-05],[-2.431337459e-05, 2.431337459e
    -05],[0.9998296029, 1.000170421]}
}
det(R) = 1
Rotation axis: 0-q1-q3
Rotation angle = 2*Pi/2
```

```
Permutation: 2 3 0 1 5 4, cycles: (0,2)(1,3)(4,5)
Orthogonal transformation: {
{[-1.000161782, -0.9998382423],[-4.441508796e-05, 4.441508796e
    -05],[-3.220982708e-05, 3.220982708e-05]},
{[-8.041697946e-05, 8.041697946e-05],[-1.000008634,
    -0.9999913628],[-2.430685196e-05, 2.430685195e-05]},
{[-3.221118476e-05, 3.221118476e-05],[-2.431337459e-05, 2.431337459e
    -05],[-1.000170421, -0.9998296029]}
}
det(R) = -1
-Identity (-Id)
```

```
Permutation: 3 2 1 0 5 4, cycles: (0,3)(1,2)(4,5)
Orthogonal transformation: {
{[-1.000161782, -0.9998382423],[-4.441508796e-05, 4.441508796e
```

```
    −05],[−3.220982708e−05, 3.220982708e−05]},
{[−7.54125579e−05, 7.54125579e−05],[−1.819727678e−05, 1.819727678e
    −05],[−1.000008055, −0.9999919424]},
{[−4.441603184e−05, 4.441603184e−05],[−1.000169841,
    −0.9998301835],[−1.820357023e−05, 1.820357023e−05]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 3 0 1 2 5 4, cycles: (0,3,2,1)(4,5)
Orthogonal transformation: {
{[−1.000161782, −0.9998382423],[−4.441508796e−05, 4.441508796e
    −05],[−3.220982708e−05, 3.220982708e−05]},
{[−7.54125579e−05, 7.54125579e−05],[−1.819727678e−05, 1.819727678e
    −05],[−1.000008055, −0.9999919424]},
{[−4.441603184e−05, 4.441603184e−05],[0.9998301835,
    1.000169841],[−1.820357023e−05, 1.820357023e−05]}
}
det(R) = −1
Rotation angle = 2*Pi/4


Number of non−trivial symmetries = 47
```

```
position 2
```

```
i: 0 X: [0.2035736351, 0.2035766966] Y: [−3.392251846e−06,
    3.392251846e−06] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.6252322656, 0.6252354758] Y: [−3.048083624e−06,
    3.048083624e−06] Z: [−5.876255276e−08, 5.876255276e−08] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [−0.203576419, −0.2035739126] Y: [−2.406244281e−06,
    2.406244281e−06] Z: [−3.113704268e−07, 3.113704268e−07] mass:
    [0.1666666667, 0.1666666667]
i: 3 X: [−0.625235681, −0.6252320604] Y: [−2.189033948e−06,
    2.189033948e−06] Z: [−3.913358261e−07, 3.913358261e−07] mass:
    [0.1666666667, 0.1666666667]
i: 4 X: [1.107395993, 1.107398873] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
i: 5 X: [−1.107405072, −1.107389794] Y: [−1.10356137e−05, 1.10356137e
    −05] Z: [−7.614688056e−07, 7.614688056e−07] mass: [0.1666666667,
```

```
   0.1666666667]
Distances from 0:
0:     [0.2035736351, 0.2035766966]
1:     [0.6252322656, 0.6252354758]
2:     [0.2035739126, 0.203576419]
3:     [0.6252320604, 0.625235681]
4:     [1.107395993, 1.107398873]
5:     [1.107389794, 1.107405072]

U = [0.5528924373, 0.5529004401], I = [0.5528921867, 0.5529006907], U
   *(I)^(1/2)/(M)^(5/2) = [0.4111126836, 0.411121796]
collinear solution no 1
planar solution no 1
```

```
position 20
```

```
i: 0 X: [-9.855350944e-10, 9.85535079e-10] Y: [0.7348027984,
   0.7348027991] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.2958872787, 0.2958872794] Y: [-9.606752284e-10,
   9.606752654e-10] Z: [-7.486296082e-11, 7.486296102e-11] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [-9.870048902e-10, 9.870048163e-10] Y: [-0.7348027991,
   -0.7348027984] Z: [-6.383341257e-10, 6.383341277e-10] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [-0.2958872795, -0.2958872786] Y: [-6.546596278e-10,
   6.546596709e-10] Z: [-1.183294744e-10, 1.183294743e-10] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.8729773552, 0.8729773557] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.8729773584, -0.8729773525] Y: [-2.285752848e-09,
   2.285752805e-09] Z: [-8.31526563e-10, 8.315265609e-10] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.7348027984, 0.7348027991]
1:     [0.2958872787, 0.2958872794]
2:     [0.7348027984, 0.7348027991]
3:     [0.2958872786, 0.2958872795]
4:     [0.8729773552, 0.8729773557]
5:     [0.8729773525, 0.8729773584]

U = [0.4631912983, 0.4631913004], I = [0.4631912982, 0.4631913005], U
   *(I)^(1/2)/(M)^(5/2) = [0.3152394695, 0.3152394717]
planar solution no 2
```

---

position 23

---

i: 0 X: [0.2267399596, 0.2271327003] Y: [0.6983101006, 0.6985663129] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.0001482256097, 0.0001482256097] Y: [-0.0002096587562, 0.0002096587562] Z: [-7.810125541e-07, 7.810125541e-07] mass: [0.1666666667, 0.1666666667]
i: 2 X: [0.2268163709, 0.227056289] Y: [-0.6985438053, -0.6983326083] Z: [-1.016223187e-05, 1.016223187e-05] mass: [0.1666666667, 0.1666666667]
i: 3 X: [-0.5943521309, -0.5939019195] Y: [-0.4318676057, -0.431449496] Z: [-2.243726347e-06, 2.243726347e-06] mass: [0.1666666667, 0.1666666667]
i: 4 X: [0.7343307666, 0.7344320141] Y: [0, 0] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 5 X: [-0.5948673096, -0.5933867407] Y: [0.4310061325, 0.4323109691] Z: [-1.318697077e-05, 1.318697077e-05] mass: [0.1666666667, 0.1666666667]
Distances from 0:
0: [0.7341988872, 0.7345639231]
1: [0, 0.000256764942]
2: [0.7342438954, 0.7345188945]
3: [0.7340763976, 0.734686385]
4: [0.7343307666, 0.7344320141]
5: [0.7333990117, 0.7353637809]

U = [0.4491356874, 0.4497248686], I = [0.4490243411, 0.4498360979], U*(I)^(1/2)/(M)^(5/2) = [0.3009625838, 0.3016296674]
planar solution no 3

---

position 25

---

i: 0 X: [-1.027634404e-05, 1.027634404e-05] Y: [0.7240947695, 0.7240958872] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-1.239508505e-05, 1.239508505e-05] Y: [-0.3620590342, -0.3620362941] Z: [0.627078209, 0.6270916892] mass: [0.1666666667, 0.1666666667]
i: 2 X: [-1.242562604e-05, 1.242562604e-05] Y: [-0.3620590066, -0.3620363217] Z: [-0.6270916723, -0.627078226] mass: [0.1666666667, 0.1666666667]
i: 3 X: [-1.261034756e-05, 1.261034756e-05] Y: [-1.60341676e-06, 1.60341676e-06] Z: [-1.501480562e-06, 1.501480562e-06] mass: [0.1666666667, 0.1666666667]
i: 4 X: [0.7285742699, 0.7285832917] Y: [0, 0] Z: [0, 0] mass:

```
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.7286309991, -0.7285265625] Y: [-2.487479985e-05,
    2.487479985e-05] Z: [-1.496472016e-05, 1.496472016e-05] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.7240947695, 0.7240958873]
1:     [0.7240838063, 0.7241068506]
2:     [0.7240838347, 0.7241068221]
3:     [0, 1.280024433e-05]
4:     [0.7285742699, 0.7285832917]
5:     [0.7285265625, 0.7286309996]

U = [0.4390852934, 0.4391134457], I = [0.4390799021, 0.4391188369], U
    *(I)^(1/2)/(M)^(5/2) = [0.2909515469, 0.2909831019]
```

```
Permutation: 0 2 1 3 4 5, cycles: (0)(1,2)(3)(4)(5)
Orthogonal transformation: {
{[0.9999876174, 1.000012383],[0, 0],[0, 0]},
{[-2.838432682e-05, 2.838432682e-05],[0.9999984559, 1.000001544],[-0,
     0]},
{[-0, 0],[-0, 0],[-1.000013926, -0.9999860733]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q1
    ]
```

```
Permutation: 1 2 0 3 4 5, cycles: (0,1,2)(3)(4)(5)
Orthogonal transformation: {
{[0.9999876174, 1.000012383],[0, 0],[0, 0]},
{[-3.423702735e-05, 3.423702735e-05],[-0.500023659,
    -0.4999763414],[0.8660023148, 0.866048493]},
{[0, 0],[-0.866059217, -0.8659915914],[-0.5000298507, -0.4999701504]}
}
det(R) = 1
Rotation axis: 0-q3-q4-q5
Rotation angle = 2*Pi/3
```

```
Permutation: 1 0 2 3 4 5, cycles: (0,1)(2)(3)(4)(5)
Orthogonal transformation: {
```

```
{[0.9999876174, 1.000012383],[0, 0],[0, 0]},
{[-3.423702735e-05, 3.423702735e-05],[-0.500023659,
   -0.4999763414],[0.8660023148, 0.866048493]},
{[-0, -0],[0.8659915914, 0.866059217],[0.4999701504, 0.5000298507]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q1, q0
   ]
```

```
Permutation: 2 0 1 3 4 5, cycles: (0,2,1)(3)(4)(5)
Orthogonal transformation: {
{[0.9999876174, 1.000012383],[0, 0],[0, 0]},
{[-3.432138464e-05, 3.432138464e-05],[-0.5000236012,
   -0.4999763992],[-0.8660484355, -0.8660023722]},
{[-0, 0],[0.8659916488, 0.8660591596],[-0.5000297929, -0.4999702082]}
}
det(R) = 1
Rotation axis: 0-q3-q4-q5
Rotation angle = 2*Pi/3
```

```
Permutation: 2 1 0 3 4 5, cycles: (0,2)(1)(3)(4)(5)
Orthogonal transformation: {
{[0.9999876174, 1.000012383],[0, 0],[0, 0]},
{[-3.432138464e-05, 3.432138464e-05],[-0.5000236012,
   -0.4999763992],[-0.8660484355, -0.8660023722]},
{[-0, 0],[-0.8660591596, -0.8659916488],[0.4999702082, 0.5000297929]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q2, q0
   ]
```

```
Permutation: 0 2 1 3 5 4, cycles: (0)(1,2)(3)(4,5)
Orthogonal transformation: {
{[-1.000143353, -0.9998566666],[-3.414398477e-05, 3.414398477e
   -05],[-2.054107692e-05, 2.054107692e-05]},
{[-6.25369768e-05, 6.25369768e-05],[0.9999984511,
   1.000001547],[-9.929158023e-10, 9.929158024e-10]},
{[-2.054110873e-05, 2.054110873e-05],[-2.277634991e-09, 2.277634991e
   -09],[-1.000144902, -0.9998551158]}
}
```

```
det(R) = 1
Rotation axis: 0-q0-q3
Rotation angle = 2*Pi/2
```

```
Permutation: 0 1 2 3 5 4, cycles: (0)(1)(2)(3)(4,5)
Orthogonal transformation: {
{[-1.000143353, -0.9998566666],[-3.414398477e-05, 3.414398477e
    -05],[-2.054107692e-05, 2.054107692e-05]},
{[-6.25369768e-05, 6.25369768e-05],[0.9999984511,
    1.000001547],[-9.929158023e-10, 9.929158024e-10]},
{[-2.054110873e-05, 2.054110873e-05],[-2.277634991e-09, 2.277634991e
    -09],[0.9998551158, 1.000144902]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q4
    ]
```

```
Permutation: 1 0 2 3 5 4, cycles: (0,1)(2)(3)(4,5)
Orthogonal transformation: {
{[-1.000143353, -0.9998566666],[-3.414398477e-05, 3.414398477e
    -05],[-2.054107692e-05, 2.054107692e-05]},
{[-6.910887834e-05, 6.910887834e-05],[-0.5000236617,
    -0.4999763378],[0.8660023106, 0.8660484956]},
{[-3.984137114e-05, 3.984137114e-05],[0.8658781821,
    0.8661726478],[0.4999046722, 0.500095344]}
}
det(R) = 1
Rotation axis: 0-q2-q3
Rotation angle = 2*Pi/2
```

```
Permutation: 1 2 0 3 5 4, cycles: (0,1,2)(3)(4,5)
Orthogonal transformation: {
{[-1.000143353, -0.9998566666],[-3.414398477e-05, 3.414398477e
    -05],[-2.054107692e-05, 2.054107692e-05]},
{[-6.910887834e-05, 6.910887834e-05],[-0.5000236617,
    -0.4999763378],[0.8660023106, 0.8660484956]},
{[-3.984137114e-05, 3.984137114e-05],[-0.8661726478,
    -0.8658781821],[-0.500095344, -0.4999046722]}
}
```

```
det(R) = -1
Rotation angle = 2*Pi/3 or Pi/3
```

```
Permutation: 2 1 0 3 5 4, cycles: (0,2)(1)(3)(4,5)
Orthogonal transformation: {
{[-1.000143353, -0.9998566666],[-3.414398477e-05, 3.414398477e
   -05],[-2.054107692e-05, 2.054107692e-05]},
{[-6.919324353e-05, 6.919324353e-05],[-0.5000236039,
   -0.4999763956],[-0.8660484382, -0.866002368]},
{[-3.984136799e-05, 3.984136799e-05],[-0.8661725904,
   -0.8658782395],[0.49990473, 0.5000952862]}
}
det(R) = 1
Rotation axis: 0-q1-q3
Rotation angle = 2*Pi/2
```

```
Permutation: 2 0 1 3 5 4, cycles: (0,2,1)(3)(4,5)
Orthogonal transformation: {
{[-1.000143353, -0.9998566666],[-3.414398477e-05, 3.414398477e
   -05],[-2.054107692e-05, 2.054107692e-05]},
{[-6.919324353e-05, 6.919324353e-05],[-0.5000236039,
   -0.4999763956],[-0.8660484382, -0.866002368]},
{[-3.984136799e-05, 3.984136799e-05],[0.8658782395,
   0.8661725904],[-0.5000952862, -0.49990473]}
}
det(R) = -1
Rotation angle = 2*Pi/3 or Pi/3

Number of non-trivial symmetries = 11
```

```
position 28
```

```
i: 0 X: [-0.1851720617, -0.1851719722] Y: [0.7018557854,
   0.7018558163] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.1851720587, -0.1851719752] Y: [-5.401591123e-08,
   5.401591201e-08] Z: [0.7018557943, 0.7018558073] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [0.01386569054, 0.01386570502] Y: [-6.746696477e-08,
```

```
    6.746696391e-08] Z: [-2.350253627e-08, 2.350253559e-08] mass:
    [0.1666666667, 0.1666666667]
i: 3 X: [-0.1851720587, -0.1851719752] Y: [-5.392082285e-08,
    5.392082297e-08] Z: [-0.7018558074, -0.7018557943] mass:
    [0.1666666667, 0.1666666667]
i: 4 X: [0.7268223675, 0.7268223726] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.185172155, -0.1851718789] Y: [-0.7018559917, -0.70185561]
     Z: [-3.654529737e-08, 3.65452982e-08] mass: [0.1666666667,
    0.1666666667]
Distances from 0:
0:      [0.7258720292, 0.7258720819]
1:      [0.7258720386, 0.7258720725]
2:      [0.01386569054, 0.01386570502]
3:      [0.7258720386, 0.7258720725]
4:      [0.7268223675, 0.7268223726]
5:      [0.7258718358, 0.7258722753]

U = [0.43933728, 0.4393373798], I = [0.4393372615, 0.4393373983], U*(
    I)^(1/2)/(M)^(5/2) = [0.2912038257, 0.2912039372]
```

```
Permutation: 0 3 2 1 4 5, cycles: (0)(1,3)(2)(4)(5)
Orthogonal transformation: {
{[0.999999993, 1.000000007],[0, 0],[0, 0]},
{[-1.312936544e-07, 1.312936562e-07],[0.999999956, 1.000000044],[0,
    0]},
{[-0, 0],[-0, 0],[-1.000000051, -0.999999949]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q1
    ]
```

```
Permutation: 1 5 2 0 4 3, cycles: (0,1,5,3)(2)(4)
Orthogonal transformation: {
{[0.999999993, 1.000000007],[0, 0],[0, 0]},
{[-1.226191347e-07, 1.226191364e-07],[-7.696155203e-08, 7.696155313e
    -08],[0.9999999815, 1.000000019]},
{[-0, 0],[-1.000000026, -0.9999999745],[-7.696155257e-08, 7.696155367
    e-08]}
}
det(R) = 1
Rotation axis: 0-q2-q4
```

```
Rotation angle = 2*Pi/4
```

```
Permutation: 1 0 2 5 4 3, cycles: (0,1)(2)(3,5)(4)
Orthogonal transformation: {
{[0.999999993, 1.000000007],[0, 0],[0, 0]},
{[-1.226191347e-07, 1.226191364e-07],[-7.696155203e-08, 7.696155313e
    -08],[0.9999999815, 1.000000019]},
{[-0, 0],[0.9999999745, 1.000000026],[-7.696155367e-08, 7.696155257e
    -08]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q3
    ]
```

```
Permutation: 3 0 2 5 4 1, cycles: (0,3,5,1)(2)(4)
Orthogonal transformation: {
{[0.999999993, 1.000000007],[0, 0],[0, 0]},
{[-1.226974516e-07, 1.226974533e-07],[-7.682607066e-08, 7.682607084e
    -08],[-1.000000019, -0.9999999814]},
{[-0, 0],[0.9999999744, 1.000000026],[-7.68260712e-08, 7.682607138e
    -08]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/4
```

```
Permutation: 3 5 2 0 4 1, cycles: (0,3)(1,5)(2)(4)
Orthogonal transformation: {
{[0.999999993, 1.000000007],[0, 0],[0, 0]},
{[-1.226974516e-07, 1.226974533e-07],[-7.682607066e-08, 7.682607084e
    -08],[-1.000000019, -0.9999999814]},
{[-0, 0],[-1.000000026, -0.9999999744],[-7.682607138e-08, 7.68260712e
    -08]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q1
    ]
```

```
Permutation: 5 3 2 1 4 0, cycles: (0,5)(1,3)(2)(4)
Orthogonal transformation: {
{[0.999999993, 1.000000007],[0, 0],[0, 0]},
{[-3.970967292e-07, 3.970967347e-07],[-1.000000544,
   -0.9999994562],[-5.206953802e-08, 5.206953921e-08]},
{[-0, 0],[-5.206953957e-08, 5.206953839e-08],[-1.000000551,
   -0.9999994492]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/2
```

```
Permutation: 5 1 2 3 4 0, cycles: (0,5)(1)(2)(3)(4)
Orthogonal transformation: {
{[0.999999993, 1.000000007],[0, 0],[0, 0]},
{[-3.970967292e-07, 3.970967347e-07],[-1.000000544,
   -0.9999994562],[-5.206953802e-08, 5.206953921e-08]},
{[-0, 0],[-5.206953839e-08, 5.206953957e-08],[0.9999994492,
   1.000000551]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q0
   ]

Number of non-trivial symmetries = 7
```

```
position 29
```

```
i: 0 X: [0.336403254, 0.336403254] Y: [0.5826675278, 0.5826675278] Z:
    [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.672806508, -0.672806508] Y: [-7.397487343e-15,
   7.424633956e-15] Z: [-1.72494075e-54, 1.72494075e-54] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [0.336403254, 0.336403254] Y: [-0.5826675278, -0.5826675278]
   Z: [-2.430957335e-54, 2.430957335e-54] mass: [0.1666666667,
   0.1666666667]
i: 3 X: [-0.336403254, -0.336403254] Y: [0.5826675278, 0.5826675278]
   Z: [-2.080637923e-54, 2.080637923e-54] mass: [0.1666666667,
   0.1666666667]
i: 4 X: [0.672806508, 0.672806508] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
```

```
i: 5 X: [-0.336403254, -0.336403254] Y: [-0.5826675278,
   -0.5826675278] Z: [-6.236536008e-54, 6.236536008e-54] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:    [0.672806508, 0.672806508]
1:    [0.672806508, 0.672806508]
2:    [0.672806508, 0.672806508]
3:    [0.672806508, 0.672806508]
4:    [0.672806508, 0.672806508]
5:    [0.672806508, 0.672806508]

U = [0.4526685972, 0.4526685972], I = [0.4526685972, 0.4526685972], U
   *(I)^(1/2)/(M)^(5/2) = [0.3045583782, 0.3045583782]
planar solution no 4
```

```
position 32
```

```
i: 0 X: [-0.2361445963, -0.2361435005] Y: [0.6640752321,
   0.6640757333] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.2361447085, -0.2361433883] Y: [-1.372229038e-07,
   1.372229036e-07] Z: [0.6640751922, 0.6640757732] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [0.1552201105, 0.1552203336] Y: [-1.803634503e-07,
   1.803634502e-07] Z: [-6.751444096e-08, 6.751444106e-08] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [-0.2361447041, -0.2361433928] Y: [-1.394862759e-07,
   1.39486276e-07] Z: [-0.6640757708, -0.6640751947] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.7893559123, 0.789356031] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.2361460829, -0.2361420139] Y: [-0.6640761904,
   -0.664074775] Z: [-6.460642053e-07, 6.460642051e-07] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:    [0.7048117952, 0.7048126347]
1:    [0.7048117201, 0.7048127098]
2:    [0.1552201105, 0.1552203336]
3:    [0.7048117239, 0.704812706]
4:    [0.7893559123, 0.789356031]
5:    [0.7048108665, 0.7048135634]

U = [0.4390357894, 0.4390366108], I = [0.4390355317, 0.4390368685], U
   *(I)^(1/2)/(M)^(5/2) = [0.2909040445, 0.2909050317]
```

```
Permutation: 0 3 2 1 4 5, cycles: (0)(1,3)(2)(4)(5)
Orthogonal transformation: {
{[0.9999998496, 1.00000015],[0, 0],[0, 0]},
{[-1.75704249e-06, 1.757043018e-06],[0.9999992452, 1.000000755],[0,
   0]},
{[-0, 0],[-0, 0],[-1.000000905, -0.9999990948]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q1
   ]
```

```
Permutation: 1 5 2 0 4 3, cycles: (0,1,5,3)(2)(4)
Orthogonal transformation: {
{[0.9999998496, 1.00000015],[0, 0],[0, 0]},
{[-2.094900343e-06, 2.094900973e-06],[-2.066375998e-07, 2.066375995e
   -07],[0.9999991251, 1.000000875]},
{[-0, 0],[-1.000001025, -0.9999989747],[-2.066376309e-07, 2.066376306
   e-07]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/4
```

```
Permutation: 1 0 2 5 4 3, cycles: (0,1)(2)(3,5)(4)
Orthogonal transformation: {
{[0.9999998496, 1.00000015],[0, 0],[0, 0]},
{[-2.094900343e-06, 2.094900973e-06],[-2.066375998e-07, 2.066375995e
   -07],[0.9999991251, 1.000000875]},
{[-0, 0],[0.9999989747, 1.000001025],[-2.066376306e-07, 2.066376309e
   -07]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q3
   ]
```

```
Permutation: 3 0 2 5 4 1, cycles: (0,3,5,1)(2)(4)
Orthogonal transformation: {
{[0.9999998496, 1.00000015],[0, 0],[0, 0]},
```

```
{[-2.081521549e-06, 2.081522174e-06],[-2.10045906e-07, 2.100459061e
    -07],[-1.000000868, -0.9999991325]},
{[-0, 0],[0.9999989821, 1.000001018],[-2.100459376e-07, 2.100459377e
    -07]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/4
```

```
Permutation: 3 5 2 0 4 1, cycles: (0,3)(1,5)(2)(4)
Orthogonal transformation: {
{[0.9999998496, 1.00000015],[0, 0],[0, 0]},
{[-2.081521549e-06, 2.081522174e-06],[-2.10045906e-07, 2.100459061e
    -07],[-1.000000868, -0.9999991325]},
{[-0, 0],[-1.000001018, -0.9999989821],[-2.100459377e-07, 2.100459376
    e-07]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q1
    ]
```

```
Permutation: 5 3 2 1 4 0, cycles: (0,5)(1,3)(2)(4)
Orthogonal transformation: {
{[0.9999998496, 1.00000015],[0, 0],[0, 0]},
{[-6.234193825e-06, 6.2341957e-06],[-1.000002131,
    -0.9999978686],[-9.728787023e-07, 9.728787019e-07]},
{[-0, 0],[-9.728788482e-07, 9.728788485e-07],[-1.000002282,
    -0.9999977182]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/2
```

```
Permutation: 5 1 2 3 4 0, cycles: (0,5)(1)(2)(3)(4)
Orthogonal transformation: {
{[0.9999998496, 1.00000015],[0, 0],[0, 0]},
{[-6.234193825e-06, 6.2341957e-06],[-1.000002131,
    -0.9999978686],[-9.728787023e-07, 9.728787019e-07]},
{[-0, 0],[-9.728788485e-07, 9.728788482e-07],[0.9999977182,
```

```
    1.000002282]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q0
    ]

Number of non-trivial symmetries = 7
```

```
position 34
```

```
i: 0 X: [0.1180988045, 0.1181003099] Y: [0.6923132818, 0.6923141749]
    Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.3284047064, 0.3284060249] Y: [-0.05937545953,
    -0.0593740591] Z: [-2.088292665e-07, 2.088292665e-07] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [-0.1624732743, -0.1624722328] Y: [-0.2915103651,
    -0.2915095336] Z: [-3.875679074e-07, 3.875679074e-07] mass:
    [0.1666666667, 0.1666666667]
i: 3 X: [-0.5659053014, -0.5659037271] Y: [-0.6894037142,
    -0.6894018357] Z: [-8.557213538e-07, 8.557213538e-07] mass:
    [0.1666666667, 0.1666666667]
i: 4 X: [0.8919212148, 0.8919219457] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.6100523207, -0.61004615] Y: [0.3479712535, 0.3479762571]
    Z: [-1.452118528e-06, 1.452118528e-06] mass: [0.1666666667,
    0.1666666667]
Distances from 0:
0:     [0.7023140379, 0.7023151714]
1:     [0.3337288272, 0.3337303738]
2:     [0.3337289838, 0.3337302172]
3:     [0.8919203548, 0.8919228057]
4:     [0.8919212148, 0.8919219457]
5:     [0.7023106851, 0.7023185242]

U = [0.4667138084, 0.4667164286], I = [0.4667134406, 0.4667167964], U
    *(I)^(1/2)/(M)^(5/2) = [0.3188422053, 0.3188451417]
planar solution no 5
```

```
position 36
```

```
i: 0 X: [-0.3486604816, -0.3486604816] Y: [0.6038976687,
    0.6038976687] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.6473628236, -0.6473628236] Y: [-4.937782744e-15,
```

```
    4.856460608e-15] Z: [-4.250763369e-61, 4.250763369e-61] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [0.3236814118, 0.3236814118] Y: [0.5606326507, 0.5606326507]
    Z: [-7.663611611e-62, 7.663611611e-62] mass: [0.1666666667,
    0.1666666667]
i: 3 X: [0.3236814118, 0.3236814118] Y: [-0.5606326507,
    -0.5606326507] Z: [-4.220556009e-61, 4.220556009e-61] mass:
    [0.1666666667, 0.1666666667]
i: 4 X: [0.6973209632, 0.6973209632] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.3486604816, -0.3486604816] Y: [-0.6038976687,
    -0.6038976687] Z: [-9.237680539e-61, 9.237680539e-61] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.6973209632, 0.6973209632]
1:     [0.6473628236, 0.6473628236]
2:     [0.6473628236, 0.6473628236]
3:     [0.6473628236, 0.6473628236]
4:     [0.6973209632, 0.6973209632]
5:     [0.6973209632, 0.6973209632]

U = [0.4526675756, 0.4526675756], I = [0.4526675756, 0.4526675756], U
    *(I)^(1/2)/(M)^(5/2) = [0.3045573471, 0.3045573471]
planar solution no 6
```

```
position 37
```

```
i: 0 X: [-0.1510901472, -0.1510901472] Y: [0.7004639915,
    0.7004639915] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.9108129027, -0.9108129027] Y: [-0.4120983598,
    -0.4120983598] Z: [-7.923366352e-15, 7.923366144e-15] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [0.4856471984, 0.4856471984] Y: [-0.01314253308,
    -0.01314253308] Z: [-3.026070978e-15, 3.026071022e-15] mass:
    [0.1666666667, 0.1666666667]
i: 3 X: [0.01360100986, 0.01360100986] Y: [-0.06305518813,
    -0.06305518812] Z: [-3.97135276e-15, 3.971352823e-15] mass:
    [0.1666666667, 0.1666666667]
i: 4 X: [0.9997025567, 0.9997025567] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.437047715, -0.437047715] Y: [-0.2121679105,
    -0.2121679105] Z: [-1.492078999e-14, 1.492079009e-14] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.7165738176, 0.7165738176]
```

```
1:     [0.9997025567, 0.9997025567]
2:     [0.4858249967, 0.4858249967]
3:     [0.06450538132, 0.06450538132]
4:     [0.9997025567, 0.9997025567]
5:     [0.4858249967, 0.4858249967]

U = [0.4980835398, 0.4980835398], I = [0.4980835398, 0.4980835398], U
   *(I)^(1/2)/(M)^(5/2) = [0.3515226267, 0.3515226267]
planar solution no 7
```

```
position 38
```

```
i: 0 X: [-0.4566235873, -0.4566079789] Y: [0.7908786539,
   0.7908848177] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.3632295667, 0.3632347355] Y: [-1.1856204e-05, 1.1856204e
   -05] Z: [-1.392834459e-08, 1.392834459e-08] mass: [0.1666666667,
   0.1666666667]
i: 2 X: [-0.1816198805, -0.1816122706] Y: [0.3145660891,
   0.3145704516] Z: [-1.289987557e-08, 1.289987557e-08] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [-0.181624349, -0.1816078021] Y: [-0.3145718203,
   -0.3145647203] Z: [-1.479310606e-08, 1.479310606e-08] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.9132295896, 0.9132335426] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.4566402266, -0.4565913395] Y: [-0.7909024052,
   -0.7908610664] Z: [-4.162132621e-08, 4.162132621e-08] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.913224995, 0.9132381372]
1:     [0.3632295667, 0.3632347357]
2:     [0.3632283596, 0.3632359426]
3:     [0.36322494, 0.3632393623]
4:     [0.9132295896, 0.9132335426]
5:     [0.9132014442, 0.9132616882]

U = [0.4829542319, 0.4829752577], I = [0.4829513282, 0.4829781612], U
   *(I)^(1/2)/(M)^(5/2) = [0.335627593, 0.3356515289]
planar solution no 8
```

```
position 47
```

```
i: 0 X: [-0.08375095279, -0.08363043549] Y: [0.7132515333,
```

```
    0.7132780332] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.3753097833, -0.375213469] Y: [-5.760928831e-05,
    5.760925882e-05] Z: [0.5877003485, 0.5877624112] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [0.1363626181, 0.1364037892] Y: [-3.021981399e-05,
    3.021983073e-05] Z: [-2.24523271e-05, 2.245228998e-05] mass:
    [0.1666666667, 0.1666666667]
i: 3 X: [-0.08376110239, -0.08362028585] Y: [-0.7132780124,
    -0.713251554] Z: [-9.190427958e-05, 9.190424432e-05] mass:
    [0.1666666667, 0.1666666667]
i: 4 X: [0.7815110569, 0.7815318169] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.3754714157, -0.3750518366] Y: [-0.0001143082968,
    0.0001143082921] Z: [-0.5878767678, -0.5875859919] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.7181377301, 0.718178094]
1:     [0.6972638288, 0.6973679723]
2:     [0.1363626181, 0.1364037944]
3:     [0.7181365688, 0.718179263]
4:     [0.7815110569, 0.7815318169]
5:     [0.6970804674, 0.6975513538]

U = [0.4388333003, 0.4389589295], I = [0.4388157086, 0.4389765307], U
    *(I)^(1/2)/(M)^(5/2) = [0.2906970731, 0.2908335731]
```

```
Permutation: 0 5 2 3 4 1, cycles: (0)(1,5)(2)(3)(4)
Orthogonal transformation: {
{[0.9999734369, 1.000026564],[0, 0],[0, 0]},
{[-0.0001751979526, 0.0001752072606],[0.9999628323, 1.000037154],[0,
    0]},
{[-0, 0],[-0, 0],[-1.000063719, -0.9999362702]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q1
    ]
```

```
Permutation: 3 5 2 0 4 1, cycles: (0,3)(1,5)(2)(4)
Orthogonal transformation: {
{[0.9999734369, 1.000026564],[0, 0],[0, 0]},
{[-0.0002036573447, 0.0002036681647],[-1.000037096,
    -0.9999628768],[-0.0001288525473, 0.0001288524978]},
```

```
{[-0, 0],[-0.0001288559207, 0.0001288559701],[-1.00006366,
   -0.9999363146]}
}
det(R) = 1
Rotation axis: 0-q2-q4
Rotation angle = 2*Pi/2
```

```
Permutation: 3 1 2 0 4 5, cycles: (0,3)(1)(2)(4)(5)
Orthogonal transformation: {
{[0.9999734369, 1.000026564],[0, 0],[0, 0]},
{[-0.0002036573447, 0.0002036681647],[-1.000037096,
   -0.9999628768],[-0.0001288525473, 0.0001288524978]},
{[-0, 0],[-0.0001288559701, 0.0001288559207],[0.9999363146,
   1.00006366]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q0
   ]

Number of non-trivial symmetries = 3
```

```
position 56
```

```
i: 0 X: [-0.2920528536, -0.2920528536] Y: [0.7237346963,
   0.7237346963] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.2374201596, 0.2374201596] Y: [0.3518298267, 0.3518298267]
   Z: [-4.416231613e-20, 4.416231613e-20] mass: [0.1666666667,
   0.1666666667]
i: 2 X: [0.3059118435, 0.3059118435] Y: [-0.5700346852,
   -0.5700346852] Z: [-2.1379239e-19, 2.1379239e-19] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [-0.3886253348, -0.3886253348] Y: [-0.5758987967,
   -0.5758987967] Z: [-1.4628963e-19, 1.4628963e-19] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.7804401193, 0.7804401193] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.643093934, -0.643093934] Y: [0.0703689589, 0.0703689589]
   Z: [-4.042443361e-19, 4.042443361e-19] mass: [0.1666666667,
   0.1666666667]
Distances from 0:
0:     [0.7804401193, 0.7804401193]
1:     [0.4244438233, 0.4244438233]
```

```
2:     [0.6469324527, 0.6469324527]
3:     [0.6947582852, 0.6947582852]
4:     [0.7804401193, 0.7804401193]
5:     [0.6469324527, 0.6469324527]

U = [0.4530097317, 0.4530097317], I = [0.4530097317, 0.4530097317], U
   *(I)^(1/2)/(M)^(5/2) = [0.3049027193, 0.3049027193]
planar solution no 9
```

```
position 67
```

```
i: 0 X: [0.05211959818, 0.05211959818] Y: [0.6524780215,
   0.6524780215] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.05211959818, 0.05211959818] Y: [0.04812232845,
   0.04812232845] Z: [0.6507010143, 0.6507010143] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [0.1486926539, 0.1486926539] Y: [-0.4670669, -0.4670669] Z:
   [-0.4338006762, -0.4338006762] mass: [0.1666666667, 0.1666666667]
i: 3 X: [-0.4537441023, -0.4537441023] Y: [-0.4189445715,
   -0.4189445715] Z: [0.2169003381, 0.2169003381] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.6545563544, 0.6545563544] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.4537441023, -0.4537441023] Y: [0.1854111215,
   0.1854111215] Z: [-0.4338006762, -0.4338006762] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.6545563544, 0.6545563544]
1:     [0.6545563544, 0.6545563544]
2:     [0.6545563544, 0.6545563544]
3:     [0.6545563544, 0.6545563544]
4:     [0.6545563544, 0.6545563544]
5:     [0.6545563544, 0.6545563544]

U = [0.428444021, 0.428444021], I = [0.428444021, 0.428444021], U*(I)
   ^(1/2)/(M)^(5/2) = [0.2804407565, 0.2804407565]
```

```
Permutation: 1 0 2 5 4 3, cycles: (0,1)(2)(3,5)(4)
Orthogonal transformation: {
{[1, 1],[0, 0],[0, 0]},
{[-5.386464596e-14, 5.386464596e-14],[0.07375317922,
   0.07375317922],[0.9972765256, 0.9972765256]},
```

```
{[-0, 0],[0.9972765256, 0.9972765256],[-0.07375317922,
    -0.07375317922]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q3
    ]
```

```
Permutation: 1 4 5 2 0 3, cycles: (0,1,4)(2,5,3)
Orthogonal transformation: {
{[0.07962583791, 0.07962583791],[0.9968248221, 0.9968248221],[0, 0]},
{[0.07351899975, 0.07351899975],[-0.005872658694,
    -0.005872658694],[0.9972765256, 0.9972765256]},
{[0.9941099952, 0.9941099952],[-0.07940897898,
    -0.07940897898],[-0.07375317922, -0.07375317922]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 4 1 5 3 0 2, cycles: (0,4)(1)(2,5)(3)
Orthogonal transformation: {
{[0.07962583791, 0.07962583791],[0.9968248221, 0.9968248221],[0, 0]},
{[0.9968248221, 0.9968248221],[-0.07962583791, -0.07962583791],[-0,
    0]},
{[-0, 0],[-0, 0],[1, 1]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q2
    ]
```

```
Permutation: 0 4 3 2 1 5, cycles: (0)(1,4)(2,3)(5)
Orthogonal transformation: {
{[0.07962583791, 0.07962583791],[0.07351899975,
    0.07351899975],[0.9941099952, 0.9941099952]},
{[0.07351899975, 0.07351899975],[0.9941273413,
    0.9941273413],[-0.07940897898, -0.07940897898]},
{[0.9941099952, 0.9941099952],[-0.07940897898,
    -0.07940897898],[-0.07375317922, -0.07375317922]}
}
det(R) = -1
```

```
Reflection with respect to the bisecting plane of the segment [q3, q2
    ]
```

```
Permutation: 4 0 3 5 1 2, cycles: (0,4,1)(2,3,5)
Orthogonal transformation: {
{[0.07962583791, 0.07962583791],[0.07351899975,
    0.07351899975],[0.9941099952, 0.9941099952]},
{[0.9968248221, 0.9968248221],[-0.005872658694,
    -0.005872658694],[-0.07940897898, -0.07940897898]},
{[-1.052109788e-14, 1.052023052e-14],[0.9972765256,
    0.9972765256],[-0.07375317922, -0.07375317922]}
}
det(R) = 1

Rotation angle = 2*Pi/3
```

```
Permutation: 3 5 4 0 2 1, cycles: (0,3)(1,5)(2,4)
Orthogonal transformation: {
{[0.2271655494, 0.2271655494],[-0.7135625479,
    -0.7135625479],[-0.6627399968, -0.6627399968]},
{[-0.7135625479, -0.7135625479],[-0.5850832759,
    -0.5850832759],[0.3853648279, 0.3853648279]},
{[-0.6627399968, -0.6627399968],[0.3853648279,
    0.3853648279],[-0.6420822736, -0.6420822736]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 5 3 4 1 2 0, cycles: (0,5)(1,3)(2,4)
Orthogonal transformation: {
{[0.2271655494, 0.2271655494],[-0.7135625479,
    -0.7135625479],[-0.6627399968, -0.6627399968]},
{[-0.7135625479, -0.7135625479],[0.3411635449,
    0.3411635449],[-0.6119116978, -0.6119116978]},
{[-0.6627399968, -0.6627399968],[-0.6119116978,
    -0.6119116978],[0.4316709056, 0.4316709056]}
}
det(R) = -1
```

```
Reflection with respect to the bisecting plane of the segment [q4, q2
   ]
```

```
Permutation: 2 5 1 0 3 4, cycles: (0,2,1,5,4,3)
Orthogonal transformation: {
{[-0.6932086126, -0.6932086126],[-0.6400435481,
   -0.6400435481],[0.3313699984, 0.3313699984]},
{[0.2832622742, 0.2832622742],[-0.6647091138,
   -0.6647091138],[-0.6913206767, -0.6913206767]},
{[-0.6627399968, -0.6627399968],[0.3853648279,
   0.3853648279],[-0.6420822736, -0.6420822736]}
}
det(R) = -1
Rotation angle = Pi/6
```

```
Permutation: 5 2 1 4 3 0, cycles: (0,5)(1,2)(3,4)
Orthogonal transformation: {
{[-0.6932086126, -0.6932086126],[-0.6400435481,
   -0.6400435481],[0.3313699984, 0.3313699984]},
{[-0.6400435481, -0.6400435481],[0.3352908862,
   0.3352908862],[-0.6913206767, -0.6913206767]},
{[0.3313699984, 0.3313699984],[-0.6913206767,
   -0.6913206767],[-0.6420822736, -0.6420822736]}
}
det(R) = 1

Rotation angle = 2*Pi/2
```

```
Permutation: 2 3 0 1 5 4, cycles: (0,2)(1,3)(4,5)
Orthogonal transformation: {
{[-0.6932086126, -0.6932086126],[0.2832622742,
   0.2832622742],[-0.6627399968, -0.6627399968]},
{[0.2832622742, 0.2832622742],[-0.738462293,
   -0.738462293],[-0.6119116978, -0.6119116978]},
{[-0.6627399968, -0.6627399968],[-0.6119116978,
   -0.6119116978],[0.4316709056, 0.4316709056]}
}
det(R) = 1
```

```
Rotation angle = 2*Pi/2
```

```
Permutation: 3 2 0 4 5 1, cycles: (0,3,4,5,1,2)
Orthogonal transformation: {
{[-0.6932086126, -0.6932086126],[0.2832622742,
   0.2832622742],[-0.6627399968, -0.6627399968]},
{[-0.6400435481, -0.6400435481],[-0.6647091138,
   -0.6647091138],[0.3853648279, 0.3853648279]},
{[0.3313699984, 0.3313699984],[-0.6913206767,
   -0.6913206767],[-0.6420822736, -0.6420822736]}
}
det(R) = -1
Rotation angle = Pi/6
```

```
Number of non-trivial symmetries = 11
```

```
position 75
```

```
i: 0 X: [0.2214967272, 0.2214967272] Y: [0.6246039852, 0.6246039852]
   Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.1208899775, -0.1208899775] Y: [-0.08539626247,
   -0.08539626245] Z: [0.6153624889, 0.6153624889] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [0.2214967272, 0.2214967272] Y: [-0.6010010388,
   -0.6010010387] Z: [-0.1700820089, -0.1700820088] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [-0.4924091506, -0.4924091506] Y: [0.4096294388,
   0.4096294388] Z: [-0.1700820089, -0.1700820088] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.6627148244, 0.6627148244] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.4924091506, -0.4924091506] Y: [-0.3478361228,
   -0.3478361228] Z: [-0.2751984713, -0.2751984712] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.6627148244, 0.6627148244]
1:     [0.6329122381, 0.6329122381]
2:     [0.6627148244, 0.6627148244]
3:     [0.6627148244, 0.6627148244]
4:     [0.6627148244, 0.6627148244]
5:     [0.6627148243, 0.6627148245]
```

```
U = [0.4327554322, 0.4327554323], I = [0.4327554322, 0.4327554323], U
    *(I)^(1/2)/(M)^(5/2) = [0.2846844804, 0.2846844804]
```

```
Permutation: 2 1 0 5 4 3, cycles: (0,2)(1)(3,5)(4)
Orthogonal transformation: {
{[1, 1],[0, 0],[0, 0]},
{[-1.724998463e-11, 1.72500735e-11],[-0.9622113419,
    -0.9622113419],[-0.2723037523, -0.2723037522]},
{[-0, 0],[-0.2723037523, -0.2723037522],[0.9622113419, 0.962211342]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q3
    ]
```

```
Permutation: 3 1 4 5 0 2, cycles: (0,3,5,2,4)(1)
Orthogonal transformation: {
{[0.3342263052, 0.3342263052],[0.9424928524, 0.9424928524],[0, 0]},
{[-0.9068773123, -0.9068773122],[0.3215963416,
    0.3215963417],[-0.2723037523, -0.2723037522]},
{[-0.2566443403, -0.2566443402],[0.091011077,
    0.09101107704],[0.9622113418, 0.962211342]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/5
```

```
Permutation: 4 1 3 2 0 5, cycles: (0,4)(1)(2,3)(5)
Orthogonal transformation: {
{[0.3342263052, 0.3342263052],[0.9424928524, 0.9424928524],[0, 0]},
{[0.9424928524, 0.9424928525],[-0.3342263052, -0.3342263052],[-0,
    0]},
{[-0, 0],[-0, 0],[1, 1]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q2
    ]
```

```
Permutation: 4 1 5 0 2 3, cycles: (0,4,2,5,3)(1)
Orthogonal transformation: {
{[0.3342263052, 0.3342263052],[-0.9068773123,
    -0.9068773122],[-0.2566443403, -0.2566443402]},
{[0.9424928524, 0.9424928525],[0.3215963416,
   0.3215963417],[0.091011077, 0.09101107704]},
{[-4.970548972e-11, 4.97055036e-11],[-0.2723037524,
    -0.2723037522],[0.9622113418, 0.962211342]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/5
```

```
Permutation: 5 1 4 3 2 0, cycles: (0,5)(1)(2,4)(3)
Orthogonal transformation: {
{[0.3342263052, 0.3342263052],[-0.9068773123,
    -0.9068773122],[-0.2566443403, -0.2566443402]},
{[-0.9068773125, -0.906877312],[-0.2352943142,
    -0.2352943137],[-0.3495856496, -0.3495856492]},
{[-0.2566443405, -0.25664434],[-0.3495856496,
    -0.3495856493],[0.9010680084, 0.9010680091]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q2
   ]
```

```
Permutation: 0 1 5 4 3 2, cycles: (0)(1)(2,5)(3,4)
Orthogonal transformation: {
{[-0.7430181618, -0.7430181617],[0.6181081571,
   0.6181081571],[-0.2566443403, -0.2566443402]},
{[0.618108157, 0.6181081572],[0.7808068198,
   0.78080682],[0.09101107699, 0.09101107705]},
{[-0.2566443403, -0.2566443401],[0.09101107694,
   0.0910110771],[0.9622113418, 0.9622113421]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q4, q3
   ]
```

```
Permutation: 5 1 0 2 3 4, cycles: (0,5,4,3,2)(1)
Orthogonal transformation: {
{[-0.7430181618, -0.7430181617],[0.6181081571,
   0.6181081571],[-0.2566443403, -0.2566443402]},
{[-0.5248654628, -0.5248654622],[-0.776083836,
   -0.7760838353],[-0.3495856497, -0.3495856492]},
{[-0.4152592658, -0.4152592652],[-0.1250447366,
   -0.125044736],[0.9010680082, 0.9010680092]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/5
```

```
Permutation: 2 1 3 4 5 0, cycles: (0,2,3,4,5)(1)
Orthogonal transformation: {
{[-0.7430181619, -0.7430181617],[-0.5248654626,
   -0.5248654624],[-0.4152592656, -0.4152592654]},
{[0.6181081568, 0.6181081575],[-0.776083836,
   -0.7760838353],[-0.1250447365, -0.1250447361]},
{[-0.2566443406, -0.2566443399],[-0.3495856498,
   -0.3495856491],[0.9010680081, 0.9010680093]}
}
det(R) = 1
Rotation axis: 0-q1
Rotation angle = 2*Pi/5
```

```
Permutation: 3 1 2 0 5 4, cycles: (0,3)(1)(2)(4,5)
Orthogonal transformation: {
{[-0.7430181619, -0.7430181617],[-0.5248654626,
   -0.5248654624],[-0.4152592656, -0.4152592654]},
{[-0.5248654628, -0.5248654621],[0.8419501527,
   0.8419501534],[-0.1250447365, -0.1250447361]},
{[-0.4152592659, -0.4152592651],[-0.1250447367,
   -0.1250447359],[0.9010680081, 0.9010680093]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q4
   ]

Number of non-trivial symmetries = 9
```

```
position 77
```

```
i: 0 X: [-0.1657434868, -0.1657434868] Y: [0.6791491244,
   0.6791491244] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.1657434868, -0.1657434868] Y: [-0.1394836664,
   -0.1394836664] Z: [0.664671227, 0.664671227] mass: [0.1666666667,
   0.1666666667]
i: 2 X: [0.3203559442, 0.3203559442] Y: [-0.01612778708,
   -0.01612778708] Z: [-0.01986355782, -0.01986355782] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [-0.219601359, -0.219601359] Y: [-0.1479020955,
   -0.1479020955] Z: [-0.1821614962, -0.1821614962] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.8849667893, 0.8849667893] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.6542344009, -0.6542344009] Y: [-0.3756355754,
   -0.3756355754] Z: [-0.462646173, -0.462646173] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:    [0.6990811374, 0.6990811374]
1:    [0.6990811374, 0.6990811374]
2:    [0.3213760997, 0.3213760997]
3:    [0.3213760997, 0.3213760997]
4:    [0.8849667893, 0.8849667893]
5:    [0.8849667893, 0.8849667893]

U = [0.4583877508, 0.4583877508], I = [0.4583877508, 0.4583877508], U
   *(I)^(1/2)/(M)^(5/2) = [0.3103483963, 0.3103483963]
```

```
Permutation: 1 0 2 3 4 5, cycles: (0,1)(2)(3)(4)(5)
Orthogonal transformation: {
{[1, 1],[0, 0],[0, 0]},
{[-2.006626695e-14, 1.998453063e-14],[-0.2053800283,
   -0.2053800283],[0.9786822998, 0.9786822998]},
{[-0, -0],[0.9786822998, 0.9786822998],[0.2053800283, 0.2053800283]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q1, q0
   ]
```

```
Permutation: 0 1 3 2 5 4, cycles: (0)(1)(2,3)(4,5)
Orthogonal transformation: {
{[-0.7392756528, -0.7392756528],[-0.4244629064,
   -0.4244629064],[-0.5227836553, -0.5227836553]},
{[-0.4244629064, -0.4244629064],[0.8964116133,
   0.8964116133],[-0.1275831519, -0.1275831519]},
{[-0.5227836553, -0.5227836553],[-0.1275831519,
   -0.1275831519],[0.8428640395, 0.8428640395]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q5, q4
   ]
```

```
Permutation: 1 0 3 2 5 4, cycles: (0,1)(2,3)(4,5)
Orthogonal transformation: {
{[-0.7392756528, -0.7392756528],[-0.4244629064,
   -0.4244629064],[-0.5227836553, -0.5227836553]},
{[-0.4244629064, -0.4244629064],[-0.308968415,
   -0.308968415],[0.8510991479, 0.8510991479]},
{[-0.5227836553, -0.5227836553],[0.8510991479,
   0.8510991479],[0.04824406781, 0.04824406781]}
}
det(R) = 1

Rotation angle = 2*Pi/2


Number of non-trivial symmetries = 3
```

```
position 78
```

```
i: 0 X: [0.0153012472, 0.0153012472] Y: [0.7243074165, 0.7243074165]
   Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.2123417131, -0.2123417131] Y: [-0.1865650076,
   -0.1865650076] Z: [0.661335677, 0.661335677] mass: [0.1666666667,
   0.1666666667]
i: 2 X: [0.06421923691, 0.06421923691] Y: [-0.004512519635,
   -0.004512519634] Z: [0.01599598052, 0.01599598052] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [0.0153012472, 0.0153012472] Y: [-0.6175215813,
   -0.6175215813] Z: [-0.3785344505, -0.3785344505] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.7520348732, 0.7520348732] Y: [0, 0] Z: [0, 0] mass:
```

```
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.6345148914, -0.6345148914] Y: [0.08429169198,
    0.08429169198] Z: [-0.298797207, -0.298797207] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.7244690206, 0.7244690206]
1:     [0.7192081638, 0.7192081638]
2:     [0.0663350934, 0.0663350934]
3:     [0.7244690206, 0.7244690206]
4:     [0.7520348732, 0.7520348732]
5:     [0.706395079, 0.706395079]

U = [0.4393203182, 0.4393203182], I = [0.4393203182, 0.4393203182], U
    *(I)^(1/2)/(M)^(5/2) = [0.2911869679, 0.2911869679]
```

```
Permutation: 3 1 2 0 4 5, cycles: (0,3)(1)(2)(4)(5)
Orthogonal transformation: {
{[1, 1],[0, 0],[0, 0]},
{[-1.144503409e-13, 1.144503409e-13],[-0.8525683532,
    -0.8525683532],[-0.5226157318, -0.5226157318]},
{[-0, 0],[-0.5226157318, -0.5226157318],[0.8525683532, 0.8525683532]}
}
det(R) = -1
Reflection with respect to the bisecting plane of the segment [q3, q0
    ]

Number of non-trivial symmetries = 1

Number of different cc = 18
the number of undecided boxes from the binary file 6
```

```
i: 0 X: [-0.3364032581, -0.3364032499] Y: [0.5826675207,
    0.5826675348] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.3364032581, -0.3364032499] Y: [-0.5826675348,
    -0.5826675207] Z: [-2.207047074e-92, 2.207047074e-92] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [0.3364032498, 0.3364032582] Y: [-0.5826675351,
    -0.5826675205] Z: [-3.175783477e-92, 3.175783477e-92] mass:
    [0.1666666667, 0.1666666667]
i: 3 X: [0.3364032498, 0.3364032582] Y: [0.5826675205, 0.5826675351]
    Z: [-6.157223309e-93, 6.157223309e-93] mass: [0.1666666667,
    0.1666666667]
i: 4 X: [0.6728064995, 0.6728065052] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
```

```
i: 5 X: [-0.6728065217, -0.672806483] Y: [-2.862822571e-08,
   2.862801696e-08] Z: [-5.998552882e-92, 5.998552882e-92] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.6728064999, 0.6728065162]
1:     [0.6728064999, 0.6728065161]
2:     [0.6728064996, 0.6728065164]
3:     [0.6728064996, 0.6728065164]
4:     [0.6728064995, 0.6728065052]
5:     [0.672806483, 0.6728065217]
-------------------------
i: 0 X: [-0.3364032581, -0.3364032499] Y: [0.5826675207,
   0.5826675348] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.3364032581, -0.3364032499] Y: [-0.5826675348,
   -0.5826675207] Z: [-2.212878115e-92, 2.212878115e-92] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [0.3364032498, 0.3364032582] Y: [-0.5826675351,
   -0.5826675205] Z: [-3.185941827e-92, 3.185941827e-92] mass:
   [0.1666666667, 0.1666666667]
i: 3 X: [0.3364032498, 0.3364032582] Y: [0.5826675205, 0.5826675351]
   Z: [-6.179901619e-93, 6.179901619e-93] mass: [0.1666666667,
   0.1666666667]
i: 4 X: [0.6728065051, 0.6728065166] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.6728065331, -0.6728064885] Y: [-2.873708621e-08,
   2.87372858e-08] Z: [-6.016810103e-92, 6.016810103e-92] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:     [0.6728064999, 0.6728065162]
1:     [0.6728064999, 0.6728065162]
2:     [0.6728064996, 0.6728065164]
3:     [0.6728064996, 0.6728065164]
4:     [0.6728065051, 0.6728065166]
5:     [0.6728064885, 0.6728065331]
-------------------------
i: 0 X: [-0.3364032808, -0.3364032272] Y: [0.5826674816, 0.582667574]
    Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.3364032267, 0.3364032814] Y: [-0.5826675756, -0.58266748]
   Z: [-3.555280879e-91, 3.555280879e-91] mass: [0.1666666667,
   0.1666666667]
i: 2 X: [0.3364032266, 0.3364032814] Y: [0.5826674799, 0.5826675756]
   Z: [-6.900040129e-92, 6.900040129e-92] mass: [0.1666666667,
   0.1666666667]
i: 3 X: [-0.3364032808, -0.3364032272] Y: [-0.5826675739,
   -0.5826674816] Z: [-2.470511965e-91, 2.470511965e-91] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.672806452, 0.6728065007] Y: [0, 0] Z: [0, 0] mass:
```

```
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.672806609, -0.6728063437] Y: [-1.880231191e-07,
    1.880211024e-07] Z: [-6.715796857e-91, 6.715796857e-91] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:      [0.6728064546, 0.6728065614]
1:      [0.6728064529, 0.6728065631]
2:      [0.6728064529, 0.6728065632]
3:      [0.6728064547, 0.6728065614]
4:      [0.672806452, 0.6728065007]
5:      [0.6728063437, 0.672806609]
-------------------------
i: 0 X: [-0.3364032809, -0.3364032271] Y: [0.5826674814,
    0.5826675742] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [0.3364032265, 0.3364032815] Y: [-0.5826675757,
    -0.5826674798] Z: [-3.564879693e-91, 3.564879693e-91] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [0.3364032265, 0.3364032815] Y: [0.5826674798, 0.5826675758]
    Z: [-6.920966105e-92, 6.920966105e-92] mass: [0.1666666667,
    0.1666666667]
i: 3 X: [-0.3364032809, -0.3364032272] Y: [-0.5826675741,
    -0.5826674815] Z: [-2.476175034e-91, 2.476175034e-91] mass:
    [0.1666666667, 0.1666666667]
i: 4 X: [0.6728065006, 0.6728065642] Y: [0, 0] Z: [0, 0] mass:
    [0.1666666667, 0.1666666667]
i: 5 X: [-0.672806673, -0.6728063918] Y: [-1.886814254e-07,
    1.886833834e-07] Z: [-6.733151337e-91, 6.733151337e-91] mass:
    [0.1666666667, 0.1666666667]
Distances from 0:
0:      [0.6728064544, 0.6728065616]
1:      [0.6728064527, 0.6728065633]
2:      [0.6728064527, 0.6728065633]
3:      [0.6728064545, 0.6728065616]
4:      [0.6728065006, 0.6728065642]
5:      [0.6728063918, 0.672806673]
-------------------------
i: 0 X: [-0.3364032581, -0.3364032499] Y: [0.5826675207,
    0.5826675348] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.3364032581, -0.3364032499] Y: [-0.5826675348,
    -0.5826675207] Z: [-2.650627701e-92, 2.650627701e-92] mass:
    [0.1666666667, 0.1666666667]
i: 2 X: [0.3364032498, 0.3364032582] Y: [0.5826675205, 0.5826675351]
    Z: [-7.394725202e-93, 7.394725202e-93] mass: [0.1666666667,
    0.1666666667]
i: 3 X: [0.3364032498, 0.3364032582] Y: [-0.5826675351,
    -0.5826675205] Z: [-3.814064392e-92, 3.814064392e-92] mass:
    [0.1666666667, 0.1666666667]
```

```
i: 4 X: [0.6728064995, 0.6728065052] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.6728065217, -0.672806483] Y: [-2.862812246e-08,
   2.862791396e-08] Z: [-7.204164613e-92, 7.204164613e-92] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:    [0.6728064999, 0.6728065162]
1:    [0.6728064999, 0.6728065161]
2:    [0.6728064996, 0.6728065164]
3:    [0.6728064996, 0.6728065164]
4:    [0.6728064995, 0.6728065052]
5:    [0.672806483, 0.6728065217]
-------------------------
i: 0 X: [-0.3364032581, -0.3364032499] Y: [0.5826675207,
   0.5826675348] Z: [0, 0] mass: [0.1666666667, 0.1666666667]
i: 1 X: [-0.3364032581, -0.3364032499] Y: [-0.5826675348,
   -0.5826675207] Z: [-2.657630598e-92, 2.657630598e-92] mass:
   [0.1666666667, 0.1666666667]
i: 2 X: [0.3364032498, 0.3364032582] Y: [0.5826675205, 0.5826675351]
   Z: [-7.421961265e-93, 7.421961265e-93] mass: [0.1666666667,
   0.1666666667]
i: 3 X: [0.3364032498, 0.3364032582] Y: [-0.5826675351,
   -0.5826675205] Z: [-3.826264282e-92, 3.826264282e-92] mass:
   [0.1666666667, 0.1666666667]
i: 4 X: [0.6728065051, 0.6728065166] Y: [0, 0] Z: [0, 0] mass:
   [0.1666666667, 0.1666666667]
i: 5 X: [-0.6728065331, -0.6728064885] Y: [-2.873707305e-08,
   2.873727289e-08] Z: [-7.226091007e-92, 7.226091007e-92] mass:
   [0.1666666667, 0.1666666667]
Distances from 0:
0:    [0.6728064999, 0.6728065162]
1:    [0.6728064999, 0.6728065162]
2:    [0.6728064996, 0.6728065164]
3:    [0.6728064996, 0.6728065164]
4:    [0.6728065051, 0.6728065166]
5:    [0.6728064885, 0.6728065331]
-----------------------------------------------------------


real 2309234.80
user 88358456.37
sys 7268691.24
```