**Icosahedron**

The icosahedron is inscribed in a sphere of radius equal to 1.

**Edge length**



**Vertices coordinates**





|  |  |  |  |
| --- | --- | --- | --- |
| 1 | c1 | 0 | c2 |
| 2 | -c1 | 0 | c2 |
| 3 | 0 | c2 | c1 |
| 4 | 0 | -c2 | c1 |
| 5 | c2 | c1 | 0 |
| 6 | -c2 | c1 | 0 |
| 7 | -c2 | -c1 | 0 |
| 8 | c2 | -c1 | 0 |
| 9 | 0 | c2 | -c1 |
| 10 | 0 | -c2 | -c1 |
| 11 | c1 | 0 | -c2 |
| 12 | -c1 | 0 | -c2 |

**Edges**

[(1, 2), (1, 3), (1, 4), (1, 5), (1, 8), (2, 3), (2, 4), (2, 6), (2, 7), (3, 5), (3, 6), (3, 9), (4, 7), (4, 8), (4, 10), (5, 8), (5, 9), (5, 11), (6, 7), (6, 9), (6, 12), (7, 10), (7, 12), (8, 10), (8, 11), (9, 11), (9, 12), (10, 11), (10, 12), (11, 12)]

**Faces**

[(1,2,4), (1,3,2), (1,4,8), (1,5,3), (1,8,5), (2,3,6), (2,6,7), (2,7,4), (3,5,9), (3,9,6), (4,7,10), (4,10,8), (5,8,11), (5,11,9), (6,9,12), (6,12,7), (7,12,10), (8,10,11), (9,11,12), (10,12,11)]

**Number of nodes from vertices**



**Number of nodes from each edge divisions**



**Node number from forward edge**

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**Node number from backward edge**



**Number of nodes from each face**



**Total number of nodes**



**Coordinates of points along an edge**



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**Face coordinate system**







**Global coordinate system**

 : face coordinate system



**Node number from face**







**Coordinates of points along a face radius in the face coordinate system**















**Coordinates in the global coordinate system**











**Number of elements from each face**

