**Dodecahedron**

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

**Edge length**



**Vertices coordinates**







|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 0 | c2 | c1 |
| 2 | 0 | -c2 | c1 |
| 3 | c3 | c3 | c3 |
| 4 | -c3 | c3 | c3 |
| 5 | -c3 | -c3 | c3 |
| 6 | c3 | -c3 | c3 |
| 7 | c1 | 0 | c2 |
| 8 | -c1 | 0 | c2 |
| 9 | c2 | c1 | 0 |
| 10 | -c2 | c1 | 0 |
| 11 | -c2 | -c1 | 0 |
| 12 | c2 | -c1 | 0 |
| 13 | c1 | 0 | -c2 |
| 14 | -c1 | 0 | -c2 |
| 15 | c3 | c3 | -c3 |
| 16 | -c3 | c3 | -c3 |
| 17 | -c3 | -c3 | -c3 |
| 18 | c3 | -c3 | -c3 |
| 19 | 0 | c2 | -c1 |
| 20 | 0 | -c2 | -c1 |

**Edges**

[(1, 2), (1, 3), (1, 4), (2, 5), (2, 6), (3, 7), (3, 9), (4, 8), (4, 10), (5, 8), (5, 11), (6, 7), (6, 12), (7, 13), (8, 14), (9, 10), (9, 15), (10, 16), (11, 12), (11, 17), (12, 18), (13, 15), (13, 18), (14, 16), (14, 17), (15, 19), (16, 19), (17, 20), (18, 20), (19, 20)]

**Faces**

[(1,2,6,7,3), (1,3,9,10,4), (1,4,8,5,2), (2,5,11,12,6), (3,7,13,15,9), (4,10,16,14,8), (5,8,14,17,11), (6,12,18,13,7), (9,15,19,16,10), (11,17,20,18,12), (13,18,20,19,15), (14,16,19,20,17)]

**Number of nodes from vertices**



**Number of nodes from each edge divisions**



**Node number from forward edge**

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****

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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**



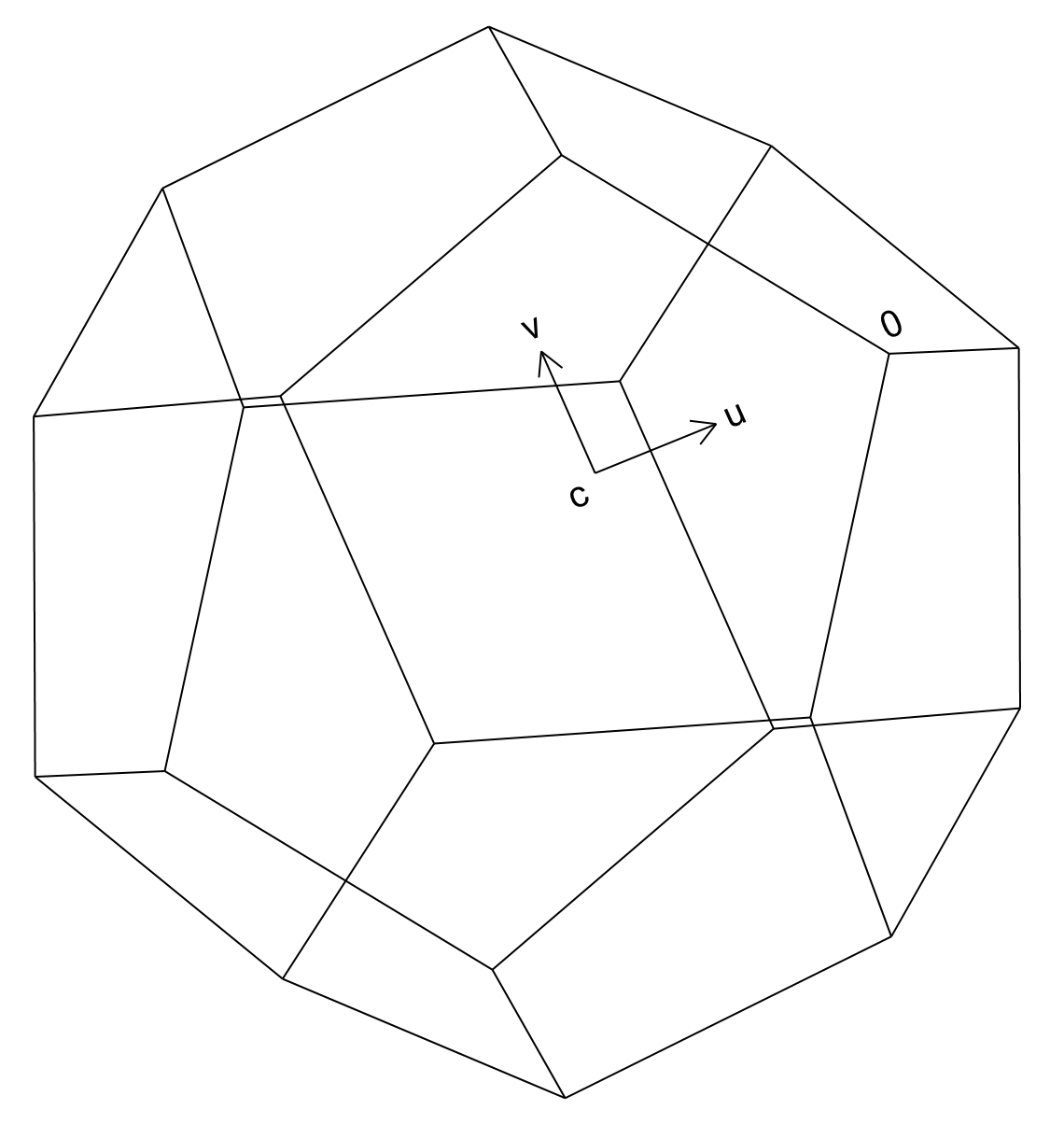
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**Face coordinate system**









**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**

