Introduction to Meshing in MATLAB

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1 Generate a 1-D Mesh

1.1 Subdivide domain into elements

1. Number of vertices
2. Number of elements

1.2 Gather vertex coordinates into an array

1. Assign a global index/name to each vertex
2. Generate a list of vertices

1.3 Generate connectivity matrix in an array

1. Assign a global index/name to each element
2. Connectivity matrix relating vertices to local element vertices

1.4 Generate shape functions on each element

1. Linear shape functions ($p = 1$)
2. Quadratic shape functions ($p = 2$)
3. Cubic shape functions ($p = 3$)

2 Generate a 2-D Rectangular Mesh

2.1 Subdivide domain into elements

1. Number of vertices
2. Number of elements

2.2 Gather vertex coordinates into an array

1. Assign a global index/name to each vertex
2. Generate a list of vertices

2.3 Generate connectivity matrix in an array

1. Assign a global index/name to each element
2. Connectivity matrix relating vertices to local element vertices