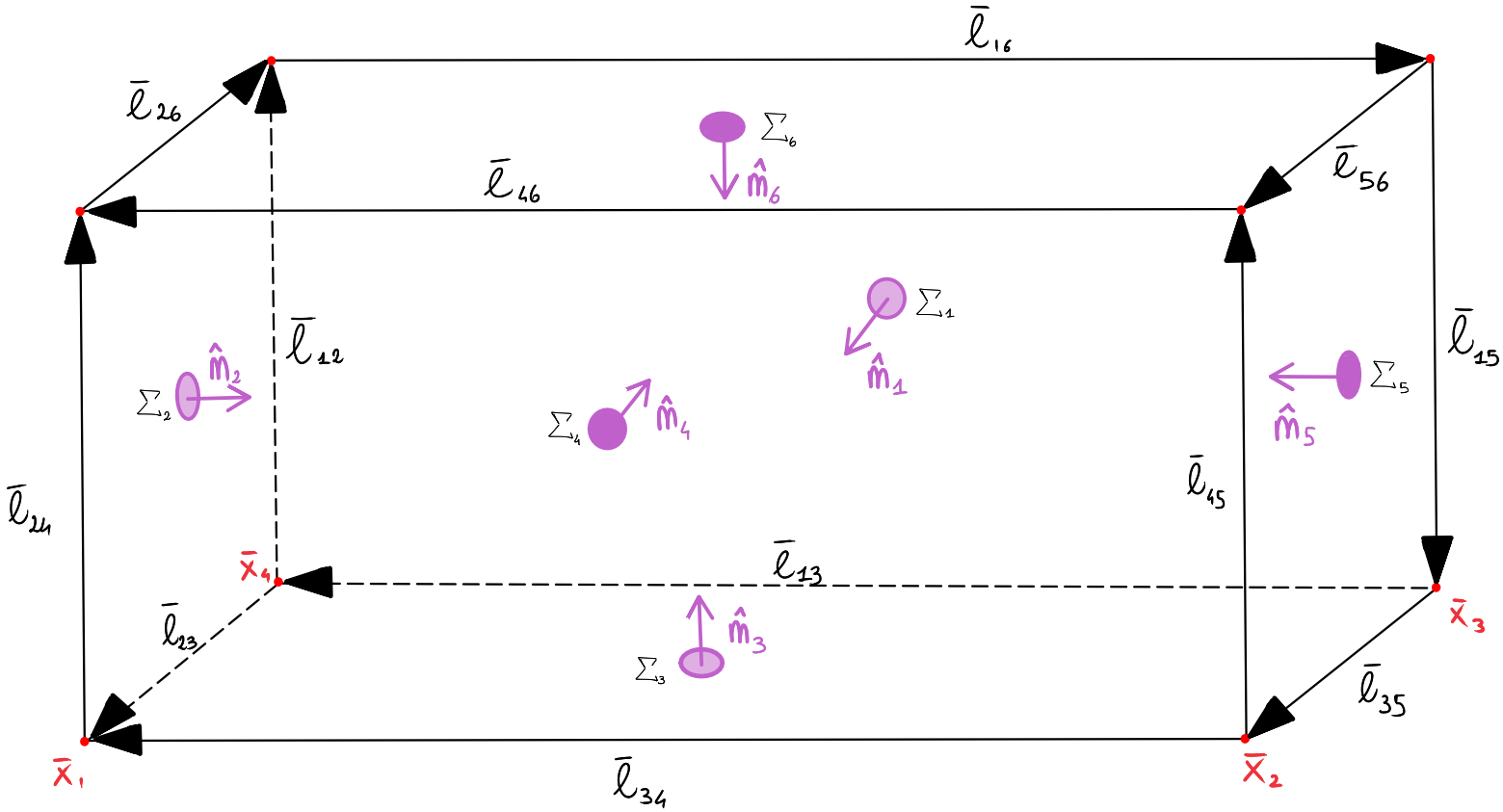
Scalar finite elements



Numbering of the nodes

A face is chosen arbitrarly and from it the first node is selected (also arbitrarly). The remaining nodes of that face are numbered in counter-clockwise order (RHR applied to the face with inward normal vector).

The face that is opposite to the one that was previously chosen is numbered with the same procedure.

Numbering of the faces

Of the 3 faces that are opposite to the j-th node, face j is chose as the one having the inward normal vector that is parallel to the vector (x_(j-1)-x_j).

Numbering of the edges

Each edge is identified by two indices (j,k) which correspond to the indices of the j-th and k-th face sharing the edge.

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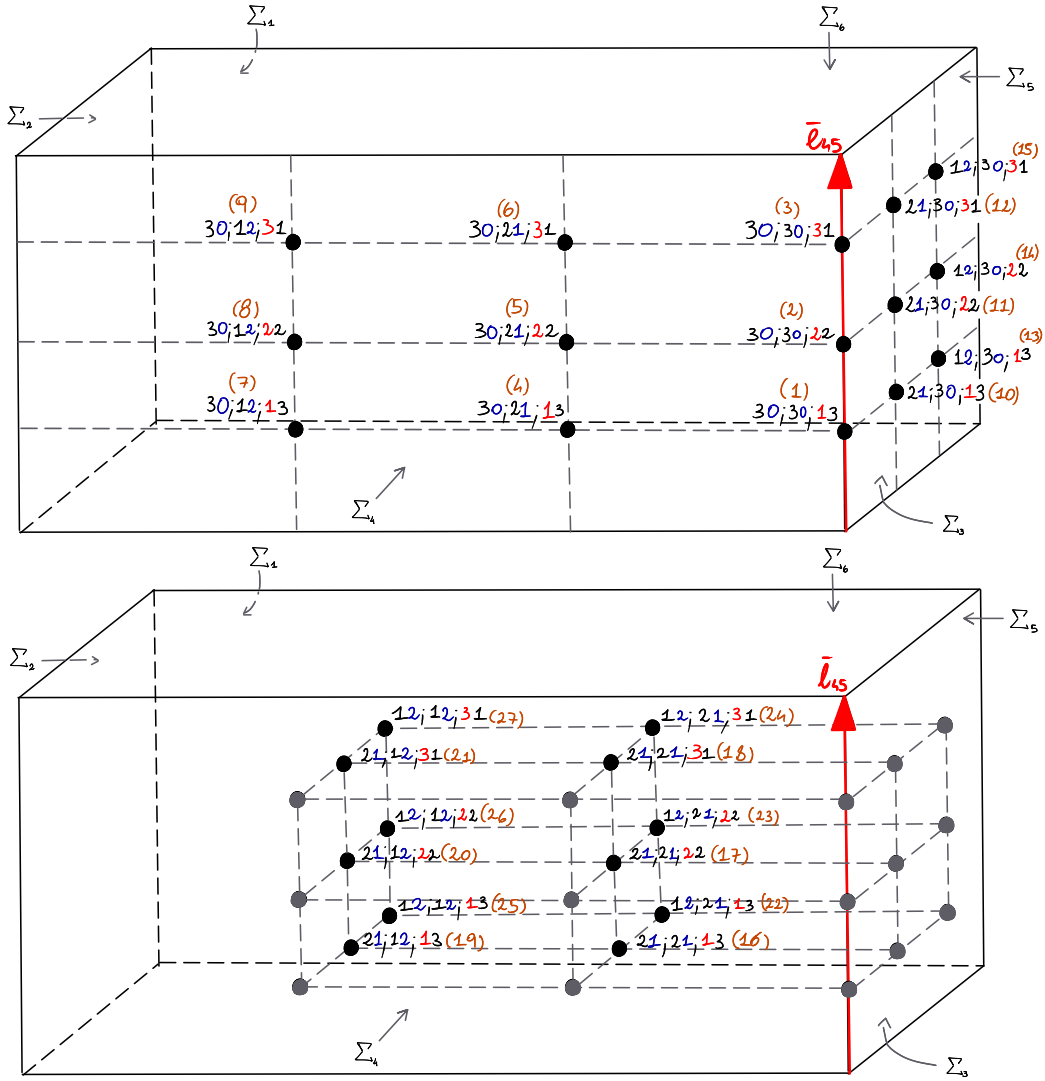
Vector finite elements



Numbering of the DOFs

Each DOF is identified by six indices (i,j;k,l;g,h) only three of which are independent.

Index i : iso-plane associated to the 1st face (i=0 means that the DOF belongs to the 1st face).
Index j : iso-plane associated to the 4th face (j=0 means that the DOF belongs to the 4th face).
Index k : iso-plane associated to the 2nd face (k=0 means that the DOF belongs to the 2nd face).
Index l : iso-plane associated to the 5th face (l=0 means that the DOF belongs to the 5th face).
Index g : iso-plane associated to the 3rd face (g=0 means that the DOF belongs to the 3rd face).
Index h : iso-plane associated to the gth face (h=0 means that the DOF belongs to the 6th face).

(i,k,g) is an independent triple of indices and so it (j,l,h) which are the opposite indices.

The DOFs are associated to edges which themselves carry two (independent) indices which are exactly those of the faces that share the edge. This means that the DOFs that are located on outer shell of the element will have at least two indices that will, at some point, have value 0.

Outer (superficial) DOFs are order separately, and with higher priority, from the inner (volumetric) DOFs.

Order of the DOFs

DOFs for the edge (r,s) are sorted by increasing values of the indices couple (r,s) in the (i,j,k,h) quadruple. If two DOFs have the same couple then they are sorted by increasing values of the q-th index (where q=min{s,p}±1).

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