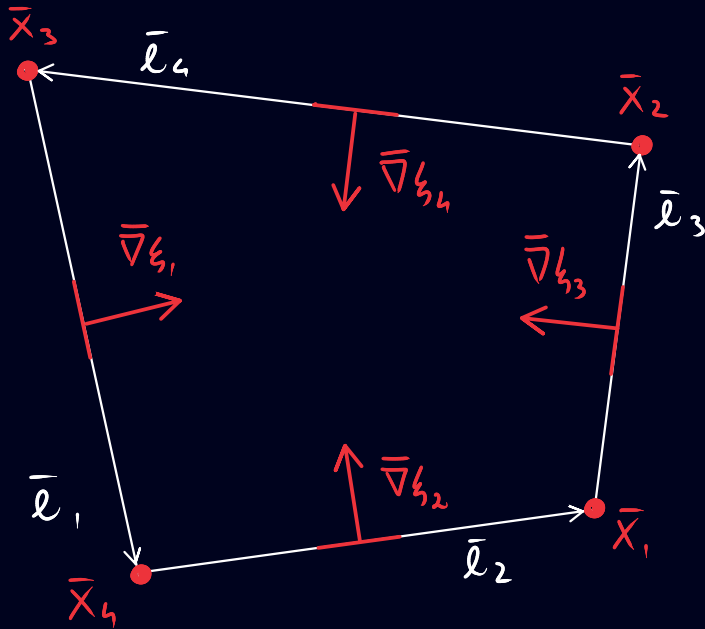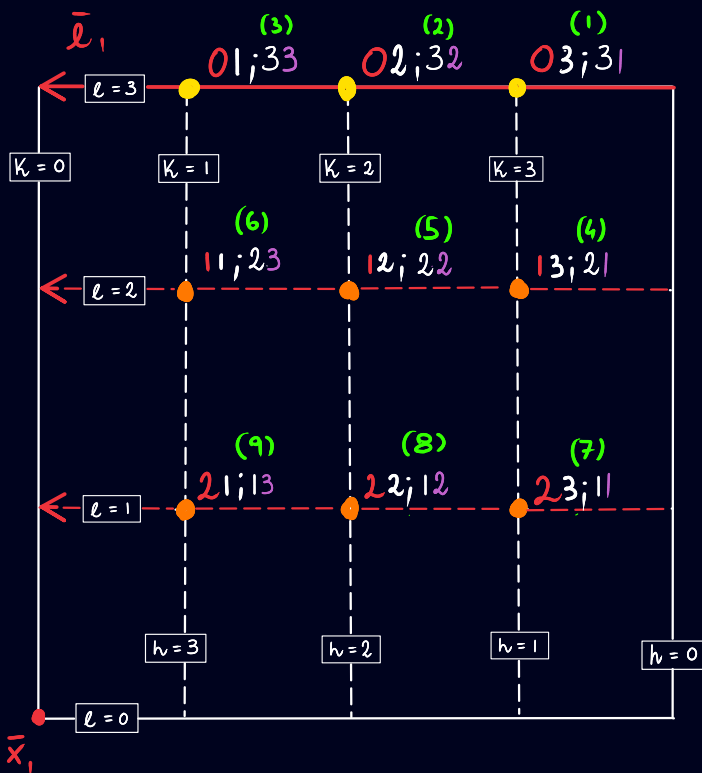# Scalar finite elements

Numbering of the nodes

The first node is chosen arbitrarly.

The remaininfig nodes are numbered in counter-clockwise order (RHR with outward normal vector).

Numbering of the edges

Of the 2 edges that are opposite to the j-th node edge j is choosen to be as the farthest from the node (so it will always be the one between node j+2 and node j-1).

Vector finite elements

Numbering of the DOFS

Each DOF is identified by four indices (j,k;l,h) only two of which are independent.

Index j : iso-lines associated to the 1st edge (j=0 means that the DOF sits upon the 1st edge).

Index k : iso-lines associated to the 2nd edge (k=0 means that the DOF sits upon the 2nd edge).

Index l : same as index j but in opposite.

Index h : same as index k but in opposite.

Order of the DOFS

The local order of the DOFs establishes the cardinality with which each is counted.

For the j-th edge the DOFS are sorted by increasing values of the j-th index.

If two DOFs have the same value for j then they are sorted by increasing values of the opposite of the remaining independent index (e.g. if the edge index is 1, which is j, then the other independent index would be k and its opposite is h, as shown in the figure).

Davide Papapicco