Classical Finite Element Analysis (FEA) uses typically C^0-basis functions across the elements which also allow for polynomials, for example Fig. 1(a), for numerically computing boundary value problems (BVPs).

On the other hand, isogeometric analysis (IGA), proposed first in [1], uses one of high order functions the so-called Non-Uniform Rational B-Spline (NURBS) basis functions that allow to maintain higher C^r continuity across the elements. Using the NURBS basis functions the discontinuous basis functions can be iteratively computed in 1D using the Cox-De Boor formula:

\[ N_0 \left( \frac{t}{\xi} \right) = \begin{cases} 1 & \text{if } 0 \leq \frac{t}{\xi} < 1 \\ 0 & \text{otherwise} \end{cases} \]

\[ N_j \left( \frac{t}{\xi} \right) = \frac{\xi - j}{\xi - j} N_{j-1} \left( \frac{t}{\xi} \right) + \frac{j}{\xi} N_{j+1} \left( \frac{t}{\xi} \right) \]

for all \( j \in \{1, \ldots, n\} \).

When the continuity constraints writes, for each time \( t \) the continuity constraints across the different patches. These must be satisfied at the sides of a C^r discretization, in particular for the membrane problem [2] and continuity of the displacement field across the subdomain solutions is of the requirements of the corresponding variational formulation. Additionally, the main interations we need to be subject into embedded nodes at the subdomain edges for each time step is obtained.

The main constraint of the membrane problem writes that the constrained node coordinates remain fixed for each time step. This is obtained to fulfill the continuity constraints across the different patches.

Formulation for a Multi-patch problem

The main constraint of the membrane problem writes at the constrained node coordinates remain fixed for each time step. This is obtained to fulfill the continuity constraints across the different patches.

Formulation for a Multi-patch problem

The main constraint of the membrane problem writes at the constrained node coordinates remain fixed for each time step. This is obtained to fulfill the continuity constraints across the different patches.

Formulation for a Multi-patch problem

The main constraint of the membrane problem writes at the constrained node coordinates remain fixed for each time step. This is obtained to fulfill the continuity constraints across the different patches.