

**Optimal parameterization technique for Isogeometric analysis**  
**Umesh Basappa<sup>1</sup>, \*Amirtham Rajagopal<sup>1</sup>**

<sup>1</sup>Department of Civil Engineering, Indian Institute of Technology Hyderabad, 502205 India.

\*Corresponding author: rajagopal@iith.ac.in

Isogeometric analysis has gained more popularity due to contribution of researchers from different disciplines. The parameter definition in isogeometric analysis includes non-descending numerals called knots. A non-zero knot span in parameter space corresponds to an element in physical domain and is analogous to meshing in classical finite element method. As we know, the accuracy of solution in finite element method depends on how best we approximate the geometry. On similar lines parametric definition in isogeometric analysis which corresponds to mesh generation also has significant impact on accuracy of solution. In this work we propose an optimal parameterization technique to improve the accuracy of the solution. The method is based on solving a constrained optimization problem in which the constraint condition is the injectivity sufficient conditions of planar B-spline parameterization and the optimization term is the minimization of quadratic energy functions related to the first and second derivatives of the planar B-spline parameterization.

**Keywords:** Isogeometric analysis, Parameterization, Mesh generation, Knots,