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Sinae Kim, Hae-Soo Oh, Birce Palta* (pbirce@uncc.edu) and **Hyunju Kim**. *B-Spline basis functions modified through partition of unity with flat-top for numerical solutions of biharmonic equations containing singularities.*

Using Partition of unity (PU) functions with flat-top, we modify B-spline functions to satisfy boundary conditions of biharmonic equations. Since the standard isogeometric analysis (IGA) has limitations to deal with biharmonic equations containing singularities, we consider enrichment methods in the framework of the p-, the k, and the h-refinements of IGA. In this talk, we demonstrate that these enriched IGA yield good approximate solutions, but they have large (almost singular) matrix condition numbers. To alleviate these limitations, we propose a mapping method to deal with singularity. To show the effectiveness of the proposed mapping method, we also compare the accuracy, the number of degrees of freedom (DOF), and condition numbers for the p-refinement, the h-refinement, and the k-refinement of IGA combined with PU with flat-top. The proposed mapping method is tested to one-dimensional singular problems and extended this method for two-dimensional biharmonic equation on cracked domain. (Received August 25, 2016)