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## Imposing boundary conditions for distortion based mesh moving and curving using an augmented Lagrangian formulation

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### Abstract

We formulate a mesh morphing technique as mesh distortion minimization problem constrained to weakly satisfy the imposed displacement of the boundary nodes. The method is devised to penalize the appearance of inverted elements during the optimization process. Accordingly, we have not equipped the method with untangling capabilities. To solve the constrained minimization problem, we apply the augmented Lagrangian technique to incorporate the boundary condition in the objective function using the Lagrangian multipliers and a penalty parameter. We have applied the proposed formulation to mesh moving and mesh curving problems. The results show that the method has the ability to deal with large displacements for 2D and 3D meshes with non-uniform sizing, and mesh curving of highly stretched 2D high-order meshes.

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