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Title. Shape gradient: A mortar Formulation

Abstract. Optimization has a wide range of applications: From mechanical structure design to inverse problems. While various optimization methods exist (SIMP, homogenization, topological gradient), one of the most popular is adapting the classical gradient method to shape perturbations. This involves computing a shape gradient. Several expressions for the shape gradient are possible, notably distinguishing between distributed and surface-based forms. All are equivalent in the continuous case, but this no longer holds after discretization. Since the work of Hiptmair et al., it has been recognized that the classical surface-based form exhibits a loss in convergence order compared to the distributed form. Recently, Gong demonstrated that a form based on flux reconstruction preserves an optimal convergence order. We propose a new variant, based on the Mortar formulation, which enjoys the same properties.