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Filling holes with geometric constraints

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Abstract

Let $D \subset \mathbf{R}^2$ be a polygonal domain, H be a subdomain of D and $f : \overline{D} - H \longrightarrow \mathbf{R}$ be a function. In this paper we propose a method to reconstruct the 'hole' of f over H using a technique based on the minimization of an energy functional. More precisely, we construct a $\mathcal{C}^1$-Powell-Sabin spline function f^* over the whole $\overline{D}$ that approximates f outside H, and fills the hole of f inside H by respecting some geometric constraints.We present some graphical and numerical examples.

Key words: Filling, approximation, finite element, Powell-Sabin, minimal energy.