Domain parameterization for blending spline surfaces on planar graphs

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Irregular mesh topologies yield plane graphs where the faces may have variadic domains. Applying a smooth blending-spline surface construction over such structures demands techniques to maintain consistent parameter lines across graph edges, of local geometry patches, shared between knot interval evaluation blocks. For example, one option is to embed specializations of the well-known Coons patch in the parametric space of adjacent evaluation blocks. We present strategies for controlling the continuity between evaluation blocks via parameterization. Our motivation is to approximate surfaces over arbitrary plane graphs while preserving the minimal support and C^k -smoothness properties of the blending spline construction. Application areas include isogeometric modeling and analysis.

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