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HIGH-ORDER MESH GENERATION ON CAD GEOMETRIES

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Abstract. During the last decade special effort has been focus on the development of high-orders methods. However, its application to industrial problems has been hampered by the need to generate high-order curved discretizations. In this work, we present a technique to extend Jacobian-based distortion (quality) measures for linear and planar triangles to high-order isoparametric elements of any interpolation degree on CAD parameterized surfaces. The resulting distortion (quality) measures are expressed in terms of the parametric coordinates of the nodes. These extended distortion (quality) measures can be used to check the quality and validity of a high-order surface mesh. Moreover, we apply them to develope a simultaneously smoothing and untangling optimization procedure that generates high-order surface meshes. The minimization is performed in terms of the parametric coordinates of the nodes. Thus, the nodes always lie on the surface. Finally, we present several examples to illustrate the application of the proposed technique.