Nitsche mortaring for elliptic problems with corner singularities and boundary layers

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The paper deals with the Nitsche mortaring for treating weak continuity across non-matching meshes for some domain decomposition. The approach is derived as a generalization of some method of J.A.Nitsche (1971) and a survey about recent results is given. In particular, the method is applied to different elliptic problems of second order in polygonal domains as well as to singularly perturbed reaction-diffusion problems. Non-matching meshes of triangles being isotropic ('shape regular') and graded near corners and anisotropic in the boundary layers are applied. Some properties as well as error estimates of the non-conforming finite element schemes are given. Finally, some numerical examples are presented. The paper is based on joint work with K. Poenitz, B. Jung(Chemnitz) and S. Nicaise(Valenciennes).