Fractional Sobolev isometric immersions
of planar domains

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Abstract. We discuss C^1 regularity and developability of isometric immersions of flat domains into $\mathbb{R}^3$ enjoying a local fractional Sobolev $W^{1+s,\frac{2}{s}}$ regularity for $2/3 \leq s < 1$, generalizing the known results on Sobolev and Hölder regimes. Ingredients of the proof include analysis of the weak Codazzi-Mainardi equations of the isometric immersions and study of $W^{2,\frac{2}{s}}$ planar deformations with symmetric Jacobian derivative and vanishing distributional Jacobian determinant. On the way, we also show that the distributional Jacobian determinant, conceived as an operator defined on the Jacobian matrix, behaves like the determinant of gradient matrices under products by scalar functions.