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DK Seminar

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Interpolation spaces of piecewise polynomials

Sobolev spaces of fractional order are the natural setting for many problems of numerical analysis (e.g. for boundary element methods). A convenient characterization is given via interpolation between the spaces of integer order, like $L^2(\Omega)$ and $H^1(\Omega)$. It allows us to transfer many results from the well understood integer case to the fractional world. In numerical analysis many results (e.g. inverse inequalities) rely on the discrete nature of the spaces involved in a method. This makes it impossible to directly apply the theory of interpolation spaces, as the interpolation norm strongly depends on the spaces involved, not just the norms used. In this talk we investigate the question, when the interpolation norms between (piecewise) polynomials, i.e. $(S^p(\mathcal{T}), \|\cdot\|_{L^2})$ and $(S^p(\mathcal{T}), \|\cdot\|_{H^1})$, coincides with the fractional Sobolev norms.