SDFEM with non-standard higher-order finite elements for a convection-diffusion problem

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Considering a singularly perturbed problem with exponential and characteristic layers, we show convergence for non-standard higher-order finite elements using the streamline diffusion finite element method (SDFEM). Moreover, for the standard higher-order space $\mathcal{Q}_p$ supercloseness of the numerical solution w.r.t. an interpolation of the exact solution in the streamline diffusion norm of order $p + 1/2$ is proved.

References:

[1] Franz, S.: SDFEM with non-standard higher-order finite elements for a convection-diffusion problem with characteristic boundary layers, (2010), submitted for publication
[2] Franz, S., Matthies, G.: Convergence on Layer-Adapted Meshes and Anisotropic Interpolation Error Estimates of Non-Standard Higher Order Finite Elements. Mathematische Schriften Kassel 01/10, Universität Kassel (2010), submitted for publication

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