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Addendum to
Error estimation in a balanced norm for a convection-diffusion problem with two different boundary layers

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1 Addendum

We would like to thanks our colleagues Martin Stynes and Stephen Russel for pointing out a mistake in our paper. The definition of δ after (2.5) is not the one needed or given in [2] (constant b-case) or [1] (variable b-case).

Following the definitions given therein and adapting them to our needs, we should use in the case of small ε for each $\tau_{ij} = (x_{i-1}, x_i) \times (y_{j-1}, y_j)$

$$\delta_i = \frac{h_i \int_{x_{i-1}}^{x_i} b_{max}(x)(x_i - x)dx}{\int_{x_{i-1}}^{x_i} b_{min}^2(x)(x_i - x)(x - x_{i-1})dx} h_i \frac{(x_i - x)(x - x_{i-1})}{h_i^2},$$

where

$$b_{max}(x) = \max_{y\in[0,1]} b(x, y) \quad \text{and} \quad b_{min}(x) = \min_{y\in[0,1]} b(x, y).$$

Then the L^∞-stability of the projection is valid and all estimations hold–because δ is independent of y they are sometimes simplified. As stated in the paper, numerically we see no difference in taking a constant δ throughout the domain.

References

1. L. Chen and J. Xu. An optimal streamline diffusion finite element method for a singularly perturbed problem. *AMS Contemporary Mathematics Series: Recent Advances in Adaptive Computation*, 383:236–246, 2005.
2. L. Chen and J. Xu. Stability and accuracy of adapted finite element methods for singularly perturbed problems. *Numer. Math.*, 109(2):167–191, 2008.

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