A Least-Squares Finite Element Method for Singularly Perturbed Reaction-Diffusion Problem

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Based on a least-squares formulation of the singularly perturbed reaction-diffusion problem, we introduce a two-stage finite element method. The first stage computes the dual variable and the second stage computes the primary variable through a local L^2 recovery from the computed dual variable. The method has all attractive approximation properties of the Lin-Stynes method (SINUM 2012). Numerical results seem to suggest the method has no numerical oscillation.