

Convergence and stability in balanced norms of finite element methods on Shishkin meshes for reaction-diffusion problems

Martin Schopf¹ Hans-G. Roos²

Error estimates of finite element methods for reaction-diffusion problems are often realized in the related energy norm. In the singularly perturbed case, however, this norm is not adequate. A different scaling of the H^1 seminorm leads to a balanced norm which reflects the layer behavior correctly. We prove an error estimate in a balanced norm and investigate also stability questions.

¹ Technical University of Dresden, Numerical Mathematics, Dresden, Germany,
martin.schopf@tu-dresden.de

² Institute of Numerical Mathematics, Department of Mathematics, Technical University of Dresden,
Hans-Goerg.Roos@tu-dresden.de