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Numerical Analysis of a Reaction Diffusion System of Lambda-Omega Type

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Abstract : In this study, we consider a nonlinear in time finite element approximation of a reaction diffusion system of lambda-omega type. We use a fixed-point theorem to prove existence of the approximations at each time level. Then, we derive some essential stability estimates and discuss the uniqueness of the approximations. In addition, we employ Nochetto mathematical framework to prove an optimal error bound in time for d= 1, 2 and 3 space dimensions. Finally, we present some numerical experiments to verify the obtained theoretical results.

Keywords : reaction diffusion system, finite element approximation, stability estimates, error bound
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