

1108-65-238

Leo G Rebholz* (rebholz@clemson.edu) and **Mengying Xiao**. *Removing splitting error in Yosida methods for Navier-Stokes equations with grad-div stabilization.*

After reviewing some recent results on removing splitting error in ‘split-then-discretize’ projection methods for solving Navier-Stokes equations by using grad-div stabilization, we discuss how grad-div can also be used to remove splitting error in the ‘discretize-then-split’ Yosida factorization methods. We prove that if pointwise divergence-free element discretizations are used together with grad-div stabilization (with parameter γ), then solutions of Yosida methods converge to the divergence-free solution of the unsplit system as $\gamma \rightarrow \infty$. Several numerical experiments are given, and also a comparison of these Yosida-penalty methods to iterated penalty methods. (Received January 14, 2015)