

DD solvers for the Stokes problem with a varying viscosity coefficient

Hyea Hyun Kim¹, Eun-Hee Park²

1) *Department of Applied Mathematics, Kyung Hee University, Yongin 17104, South Korea*

2) *Division of Liberal Studies, Kangwon National University, Samcheok 25913, South Korea*

Corresponding Author : Eun-Hee Park, eh.park@kangwon.ac.kr

ABSTRACT

In this talk we will discuss domain decomposition solvers for the Stokes problem with a varying viscosity coefficient. A FETI-DP algorithm for the Stokes problem with a constant viscosity was proposed in the previous work by the authors. In a similar manner, a finite element discrete problem is obtained by adopting the inf-sup stable finite element space where the functions in the pressure space can be discontinuous across the element boundary. First based on a non-overlapping subdomain partition, a multi-domain problem is considered, which is equipped with the continuity constraint across the subdomain interface. Then a FETI-DP formulation is derived by introducing Lagrange multipliers to enforce the continuity constraint. For iterations on the dual problem in FETI-DP formulation, preconditioners are proposed, where the scaling procedure is employed to treat the ill-conditioned property in connection with the presence of a discontinuous viscosity. Finally, Theoretical results for the condition number estimate of the preconditioned problem will be presented along with numerical results.

REFERENCES

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