

## BALANCING NEUMANN-NEUMANN PRECONDITIONER FOR A DIAGONAL-SCALED SCHUR COMPLEMENT EQUATION

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For many of actual problems in science and engineering fields, there should be modeled with multi-materials and large-scale unstructured mesh. However, the Domain Decomposition Method (DDM) based on the iterative methods is well-known as an effective parallel finite element method, solving such problems will suffer from slow convergence or no convergence. In order to achieve high performance in both convergence rate and parallel efficiency, it is necessary to apply an effective preconditioner for the DDM.

The Balancing Neumann-Neumann (BNN) preconditioner [1] is an effective preconditioner for its very fast convergence rate. However, considering composition of very different materials for actual problems, the convergence rate of the BDD is also shown to be worse. Some studies extended the BNN preconditioner to such problems with jumps in coefficients [2][3], but these are not suitable for cases of complex shape and composite materials.

In this study, to accelerate convergence of BNN preconditioner for multi-materials, a BNN method combined with diagonal scaling preconditioner is proposed.

### REFERENCES

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