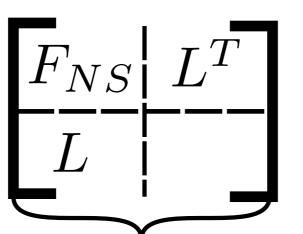
Matrix



Augmented Jacobian

$$F_{NS} + L^T W^{-1} L = \begin{bmatrix} \frac{\tilde{F}}{B} & B^T \\ B & B \end{bmatrix}$$

Modified Navier-Stokes Jacobian

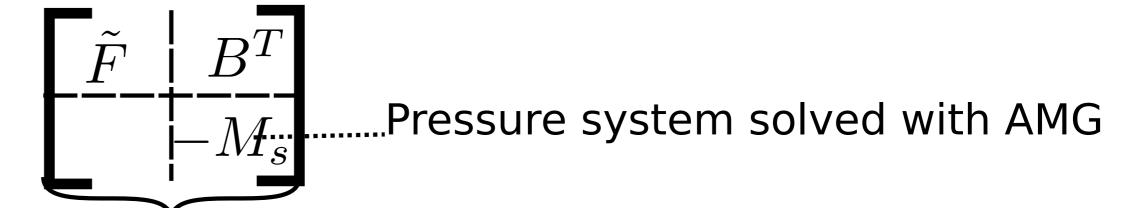
$$\tilde{F} = \begin{array}{|c|c|} \hline F_{bb} & F_{bc} \\ \hline F_{cb} & F_{cc} \\ \hline \end{array}$$

Navier-Stokes momentum block partitioned into bulk and constrained DOF types

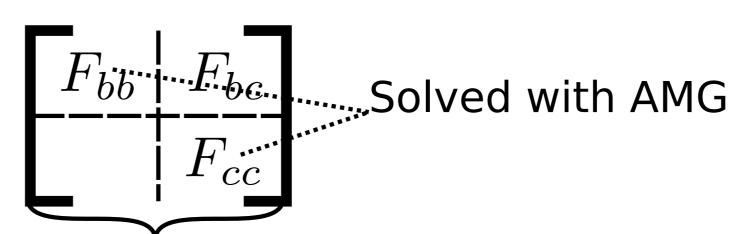
Corresponding Preconditioner

$$F_{NS} + L^T W^{-1} L$$
Solved with SuperLU

Augmented Lagrangian preconditioner (master preconditioner)



Navier-Stokes LSC preconditioner



Upper block triangular preconditioner