1077-35-2421 **Geoffrey Robert Wienefeld Dillon*** (`geoffrey.dillon@ttu.edu`), Texas Tech University, Department of Mathematics, Broadway and Boston, Lubbock, TX 79409-1042. *Schur Complements and Block Preconditioners for Coupled Diffusion Systems.* Preliminary report.

Discretization of systems of coupled PDE under finite elements or finite differences gives rise to block-structured algebraic systems. Expensive to solve, these systems require effective preconditioning. Many of these preconditioners are based on block LU factorizations. In such factorizations, one obtains the Schur complement by eliminating one field in terms of the other. Preconditioners constructed in this manner require the inverse of the Schur complement, which is very expensive to compute. We study a particular simple strategy for approximating the Schur complement that has some general applicability, giving examples both of the resulting block preconditioner and solving the Schur complement system for some coupled PDE. (Received September 22, 2011)