1048-65-210 **Jeffrey M. Connors** (jmc116@pitt.edu) and **Alexander E. Labovsky*** (ayl@math.missouri.edu). *Semi-implicit spectral deferred correction decoupling methods for a parabolic two domain problem.* Preliminary report.

A numerical approach to estimating solutions to coupled systems of equations is partitioned time stepping methods, an alternative to monolithic solution methods, recently studied in the context of fluid-fluid and fluid-structure interaction problems. Few analytical results of stability and convergence are available, and typically such methods have been limited to first order accuracy in terms of discretization parameters. Many proposed higher-order schemes are unstable, or their stability is yet to be proven analytically. We consider two heat equations in $\Omega_1, \Omega_2 \subset \mathbb{R}^2$ adjoined by an interface $I = \Omega_1 \cap \Omega_2 \subset \mathbb{R}$ - as a simplified model for the fluid-fluid or fluid-structure interactions. We present the family of semi-implicit spectral deferred correction (SISDC) methods for the partial differential equations. We prove stability and the desired second-order accuracy of the two-step SISDC method (one simpler method from this family), and we also perform computational tests which verify the second-order time accuracy of the two-step method. (Received February 08, 2009)