1044-35-228 **Beth M. Campbell Hetrick*** (bcampbel@gettysburg.edu), Gettysburg College, Department of Mathematics, 300 N. Washington Street, Gettysburg, PA 17325, and **Rhonda J. Hughes**.

Continuous Dependence on Modeling for Nonlinear Ill-Posed Problems.

Given an ill-posed problem, it may be convenient to define an approximate problem that is well-posed. We prove that the solution to the original problem, if it exists, depends continuously on the solution to a corresponding approximate well-posed problem. Using semigroup theory and operator theoretic methods, we study the nonlinear inhomogeneous Cauchy problem $\frac{du}{dt} = Au(t) + h(t, u(t))$, $u(0) = \chi$, $0 \leq t < T$; where A is a positive self-adjoint operator on a Hilbert space H, $\chi \in H$, and $h : [0, T) \times H \to H$. For a suitable function f, the approximate problem is given by $\frac{dv}{dt} = f(A)v(t) + h(t, v(t)), v(0) = \chi$. Under certain stabilizing conditions, we prove that $\|u(t) - v(t)\| \leq C\beta^{1-\frac{t}{T}} M^{\frac{t}{T}}$, where C and M are computable constants independent of β and $0 < \beta < 1$. Results are also obtained for the linear case in Banach space. These results extend to the inhomogeneous case earlier work by Hughes and Professor Karen Ames, who did pioneering work in this area. (Received September 02, 2008)