1057-65-156 **Jie Shen*** (shen@math.purdue.edu), Mathematics Department, Purdue University, West Lafayette, IN 47907. *Numerical Approximations of Allen-Cahn and Cahn-Hilliard Equations.*

Stability analyses and error estimates are carried out for a number of commonly used numerical schemes for the Allen-Cahn and Cahn-Hilliard equations. It is shown that all the schemes we considered are either unconditionally energy stable, or conditionally energy stable with reasonable stability conditions in the semi-discretized versions. Error estimates for selected schemes with a spectral-Galerkin approximation are also derived. The stability analyses and error estimates are based on a weak formulation thus the results can be easily extended to other spatial discretizations, such as Galerkin finite element methods, which are based on a weak formulation. (Received January 20, 2010)