1067-65-612 **R. Corban Harwood*** (rharwood@math.wsu.edu), Department of Mathematics, PO Box 643113, Neill 103, Pullman, WA 99164-3113, and **Likun K. Zhang**, **T. Zaki Jubery**, **Greg M. Vogel**, **W. Gitau Munge**, **Joe J. Theisen** and **V. S. Manoranjan**. *Oscillation-Free Operator Splitting Method for Semilinear Diffusion Equations.*

An oscillation-free splitting method is presented for the solution of semilinear diffusion equations. Instead of numerically solving the equation as a whole, an operator splitting technique is applied to the partial differential equation, where the linear diffusion and the nonlinear remainder portions are solved separately. A weighted Euler scheme is developed to give an oscillation-free solution to the diffusion portion with second order spatial and temporal accuracy, while the remainder portion is solved exactly for a specific problem. Since oscillations can lead to instabilities in solutions to nonlinear differential equations, this oscillation-free method ensures global stability. To maintain second order global accuracy in both space and time, the solutions of these two portions are combined alternatingly. This accuracy is discussed analytically, by relating it to one utilizing a linearized operator, and verified numerically. (Received September 11, 2010)