1014-92-1193 **Azmy S. Ackleh**, P.O. Box 41010, Department of Mathematics, Lafayette, LA 70504-1010, **Keng Deng**, P.O. Box 41010, Department of Mathematics, Lafayette, LA 70504-1010, **Kazufumi Ito**, Department of Mathematics, Raleigh, NC 27695-8205, and **Jeremy J. Thibodeaux*** (jjt9667@louisiana.edu), P.O. Box 41010, Department of Mathematics, Lafayette, LA 70504-1010. *An Erythropoiesis Structured Model with Nonlinear Cell Maturation Velocity and Hormone Decay Rate.*

We develop a quasilinear structured model which describes the regulation of erythropoiesis, the process in which red blood cells are developed. In our model, maturation velocity of precursor cells is assumed to be a function of the erythropoietin hormone, and the decay rate of this hormone is assumed to be a function of the number of precursor cells, unlike other models which assume these parameters to be constants. Existence-uniqueness results are established and convergence of a finite difference approximation to the unique solution of the model is obtained. The finite difference scheme is then used to investigate the effects of these nonlinear parameters on the model dynamics. Our results show that a velocity of precursor cells maturation rate which is an increasing function of the hormone level and a decay rate of the hormone which is an increasing function of the number of precursor cells have a stabilizing effect on the dynamics of the model. While assuming that one parameter is a function and letting the other be a constant stabilizes the oscillations in the mature cells level, the effect is much more significant when both parameters are taken to be functions. (Received September 27, 2005)