1056-92-786   **James F Selgrade*** (`selgrade@math.ncsu.edu`), North Carolina State University, Box 8205, Raleigh, NC 27695-8205. *Bifurcation analysis of a model for hormonal regulation of the menstrual cycle.*

A model for hormonal control of the menstrual cycle with 41 parameters is introduced. Important changes in model behavior result from variations in two of the most sensitive parameters. One parameter represents the level of estradiol sufficient for significant synthesis of luteinizing hormone, which causes ovulation. By studying bifurcation diagrams in this parameter, an interval of parameter values is observed for which a unique stable periodic solution exists and it represent an ovulatory cycle. The other parameter measures mass transfer between the first two stages of ovarian development and is indicative of healthy ovarian growth. Changes in this parameter affect the uniqueness interval defined with respect to first parameter. Hopf, saddle-node and transcritical bifurcations are examined. To attain a normal ovulatory menstrual cycle in this model, a balance must be maintained between healthy development of the ovaries and flexibility in estradiol levels needed to produce the surge in luteinizing hormone. (Received September 17, 2009)