

1135-37-1795

Mojtaba Moniri* (m-moniri@wiu.edu) and **Saman Moniri** (moniri@umich.edu). *Attracting and repelling cycles, Gröbner bases, and Brouwer's FPT.*

In approximating the onset and the first bifurcation points of the parameters for logistic maps for various short periodic orbits, calculation of Gröbner bases via computer algebra systems such as Mathematica have shown useful. If one picks a parameter rather close to such a bifurcation point, direct approximation of the limiting cycle and its length determination could be problematic (this is due to accumulation of round-off error at each iteration step). We use Gröbner bases to deeper approximate some attracting and repelling limiting cycles of interest beyond what is achievable by iteration. We also provide examples where the iterative cycle approximation, while is still valid, may (and for some other examples may not) be supplied to Brouwer's fixed point theorem to establish the period length. (Received September 24, 2017)