

1145-O1-2365

**Amine Benkiran\***, azb165@psu.edu, and **Eric Simring, Andrew M. Baxter** and **Andrew Belmonte**. *Analyzing systems of differential equations by first-year life-science majors*. Preliminary report.

A first-year calculus sequence can meaningfully analyze not only a single ordinary differential equations, but systems of differential equations. The calculus sequence for life-science majors at Penn State University is a re-imagined treatment of calculus, starting from the traditional limits, derivatives, and integrals in the first semester, but then pivoting in the second semester to matrix algebra, Markov chains, differential equations, and systems of differential equations. By the end of the Biocalculus sequence students are fluent in using first-order differential equations to model dynamic systems as well as the use of elementary solution methods (separation and integrating factor). Students analyze the stability and asymptotic behavior of real-life scenarios such as population dynamics, harvesting natural resources, spread of epidemics, and so on. Our curriculum also focuses on solving 2x2 linear and nonlinear systems of ODEs, analyze their stability, and study applications such as predator-prey models, cooperation models, SIR model, and so on. In this talk we will describe how we have arranged the Biocalculus curriculum, the motivations for prioritizing the study of ODEs, share specific examples discussed in the course, and how a third-semester course continues this focus (Received September 25, 2018)