Resources, Community, and Support for Teaching Differential Equations through Modeling

Chris McCarthy, Borough of Manhattan Community College, CUNY
Brian Winkel, Emeritus United States Military Academy, West Point; SIMIODE

Abstract
We offer a discussion on why it is a good approach to teach mathematics in context and to use modeling to motivate the learning of mathematics—in particular, differential equations. We illustrate a case where faculty and students do collaborative and interdisciplinary research and use differential equation models. We give rich examples of a modeling-first approach to teaching differential equations and describe a community of learners and teachers who practice this approach. We indicate where all can find resources on which to base their own venture into using modeling and context to teach mathematics.

Chris McCarthy has taught at both four-year and two-year colleges. He currently is an assistant professor of mathematics at Borough of Manhattan Community College, which is part of the City University of New York. His research interests include topics in pure and applied mathematics. He regularly mentors student researchers, and he enjoys collaborating with colleagues.

Brian Winkel has taught at liberal arts colleges, engineering schools, and military academies and has always found that students appreciate learning mathematics in context. In order to permit colleagues to share narratives about their teaching efforts, he founded the journal PRIMUS – Problems, Resources, and Issues in Mathematics Undergraduate Studies in 1991. His current interest is in leading SIMIODE—Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations, at www.simiode.org—where teachers can find resources, community, and support for teaching differential equations through modeling.