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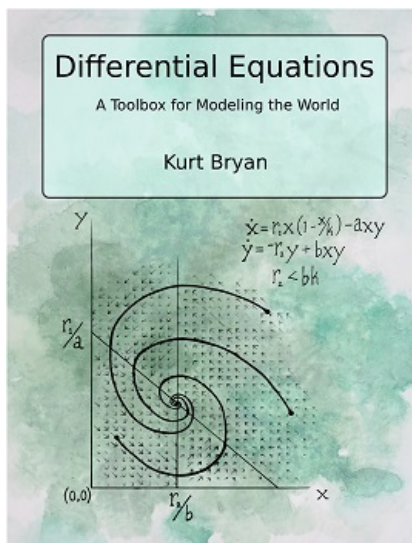
EXCEPTIONAL NUMERICAL METHODS TEXTBOOK

Eric Sullivan of Carroll College, Helena MT USA has authored an exceptional numerical methods textbook. *Numerical Methods - An Inquiry-Based Approach With Python* is the perfect book for creatively teaching numerical methods using the very popular Python environment. This is an OER effort on the part of Eric to explore the joy of numerical methods. He has provided several versions HTML, PDF, and Print on Demand, along with Google Colab materials and Jupyter Notebooks and YouTube Playlist for Python How to materials. With chapters to match up to specific courses and topics this text, in addition to serving as a text for numerical methods course, will complement many other courses using these methods. The section of the text - go ahead and look it up in the posted [numerical methods textbook](#) - "How To Make Mathematics Readable - 10 Things To Do" is magnificent and we can all use it with our students (and wrt. our own writing!) This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. We commend it to you, for it is a work of passion and care and you will find it useful, priced right(!), and a joy to read and use in teaching.

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SIMIODE ONLINE DIGITAL TEXT

DIFFERENTIAL EQUATIONS: A TOOLBOX FOR MODELING THE WORLD



SIMIODE offers its digital online textbook, *Differential Equations: A Toolbox for Modeling the World*. The online low cost textbook is available for purchase through SIMIODE for \$39US.

Authored by the distinguished teacher and writer, Dr. Kurt Bryan, Rose-Hulman Institute of Technology, Terre Haute IN USA, this text takes a modeling first and throughout approach to motivate the study and learning of differential equations in the spirit of SIMIODE, while linking to many SIMIODE Modeling Scenarios and other original activities.

Here we offer a copy of the [Table of Contents](#) and [Chapter 1](#) to demonstrate our commitment to a modeling first and throughout approach in teaching differential equations.

The text offers some 600 pages of rich modeling motivated materials with support groups in SIMIODE for Students and Teachers with some 400 additional pages of materials to help teacher and student at SIMIODE

[Textbook - Teacher Group](#) or a [SIMIODE Textbook - Student Group](#).

Differential Equations: A Toolbox for Modeling the World puts applications and modeling front and center in an introduction to ordinary differential equations. In taking this approach we do not skimp on or skip over the mathematics, but use applications to motivate both subject and technique. The mathematics presented is interwoven with modeling to drive both the mathematics and understanding of the application under study and to make the case that differential equations provide a powerful, indispensable toolbox for describing the world.

Dr. Glenn Ledder, University of Nebraska, Lincoln NE USA, says in his forthcoming review in *The UMAP Journal*, "This book is the only one this reviewer is aware of that presents differential equations in a modeling context rather than merely adding a bit of modeling to the standard presentation. If you want to study the mathematics of differential equations in a modeling context, you are in the right place."

We also present some unconventional, but important topics not usually offered in introductory texts: dimensional analysis, parameter estimation, a brief introduction to control theory via Laplace transforms, nondimensionalizing and scaling of differential equations, and a more thorough treatment of electrical circuits. The text includes numerous exercises, including inline "Reading Exercises," as well as a section of more extensive modeling projects at the end of each chapter, many based on published SIMIODE projects, and many new activities. Several projects include data sets for experimentation and model validation.

Purchasers of this text will be invited to engage in a SIMIODE Textbook - Teacher Group or a SIMIODE Textbook - Student Group in which all the resources appropriate to the respective interests of the group will be provided: solutions, hints, project ideas, data, computer code, forums, collaborative project space, etc.

Again, [purchase this textbook](#), support SIMIODE, enjoy the read, and adopt the text for your course on behalf of your students.

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SIMIODE CONTRIBUTED SESSION AT MATHFEST, 3-6 AUGUST 2022

SIMIODE will host a Contributed Paper Session, *Share the Joy in Teaching Differential Equations Through Modeling*, at MathFest 2022, Philadelphia, 3-6 August 2022. This will be a full in-person meeting, with a robust virtual component for remote attendance. So plan to submit an abstract when the process opens soon and then attend. Look for details at [MAA.org](#). Once the Call for Papers has been issued you will have until 21 May 2022 to submit an abstract. So think about sharing your experiences and the joy in using modeling to motivate and teach differential equations in context, both as an introduction to the mathematics and as a narrative of a complete modeling cycle from experiencing a real-world phenomenon, through data collection, to model building with parameter estimation, and finally model validation.

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MAA OPEN MATH WORKSHOP - 5-8 JULY 2022

The Mathematical Association of America (MAA) and the University of Colorado Boulder (CU-B) are implementing a new online teaching- and learning-focused professional development program which will reach higher education professionals, including those who have been less able to travel due to various constraints. SIMIODE is proud to be a part of this effort with an intensive workshop, *Modeling Inspiration for Differential Equations* for teachers who wish to do modeling in their differential equations course. A team of colleagues will engage participants in modeling activities so they experience the activity as students and then support them as they teach units to workshop colleagues to feel the joy of using modeling in teaching. Look for details at [MAA.org](#).

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PRISON MATHEMATICS PROJECT

At the SIMIODE EXPO 2022 Conference there was an exceptional Keynote talk followed by an informal Breakout discussion, given by Amit Sahai, Computer Science, University of California, Los Angeles CA USA; Christopher Havens, Executive Director and Founder, Prison Mathematics Project, TRU at Monroe Correctional Complex, Monroe WA USA; Ruth Utnage, Executive Assistant, Prison Mathematics Project, Seattle WA USA; Trubee Davison, Mathematics, Western Colorado University, Gunnison CO USA; and Timothy Pennings, Davenport University, Grand Rapids MI USA, about the Prison Mathematics Project. The Prison Mathematics Project (PMP) works towards a new understanding of the role of mathematics in self-identity and desistance among a demographic of prisoners who are actively exploring a higher education. The aim is to achieve positive changes in self-identity and desistance by providing knowledge, instilling a sense of community and culture, and establishing network connections to promote self-rehabilitation among participants through engagement of mathematics. Such engagement is nurtured through active mentorship by members of the mathematical community. See the current issue of the *Prison Math Newsletter* 3.

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NOTICES OF THE AMERICAN MATHEMATICAL SOCIETY

The Notices of the American Mathematical Society is the place to go for mathematics news, expository articles, and practical pieces for colleagues at all stages of their careers. The Early Career section offers a community project since 2019, in which thematic-compilations of articles inform graduate students, job seekers, early career academics, and mentors. Often, the pieces have great advice and raise awareness of issues that could advance careers.

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PROGRAM FOR SIMIODE EXPO 2022, 10-13 FEBRUARY 2022

With the successful completion of SIMIODE EXPO 2020, an international and online conference, 10-13 February 2022, we are beginning to post the slides and will soon post the videos of the very stimulating talks and sessions. Look for these in the [EXPO 2022 Program](#). While focusing on differential equations the conference featured keynotes and talks in areas such as cryptology, dietary modeling, communication, modeling, data, and much more. Catch the action after the conference and plan to attend SIMIODE EXPO 2023 next February 2023.

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STARTER KIT IN SIMIODE YOU MIGHT HAVE MISSED

RECOMMEND TO YOUR COLLEAGUES

SIMIODE offers a [StarterKit](#) of materials proven to work in the classroom. These Modeling Scenarios have been used by thousands of teachers to engage students in learning differential equations through modeling. This is where you refer your colleagues to if you want to show them materials they can use to try modeling in their classroom. You too might see some other materials you could use either early on in your course or once you are off and doing modeling. Give them a look see and make them part of your teaching!

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SIMIODE SOURCES FOR YOUR OWN MODELING SCENARIOS

SIMIODE offers potential modeling scenario ideas. There are now over 500 of these! These are materials, thoughts, pointers, summaries, articles, etc. to encourage and support your modeling scenario ideas. You must be registered and signed in to view these resources. Consider these ideas and use them to design your own modeling scenarios for your students and then publish this material in SIMIODE.

Of course, you can publish your own source materials, perhaps ideas you have not been able to get to, but want to or wish to engage with others in producing a Modeling Scenario. Just upload them for all to see. Use the "Start a new Potential Scenario Idea" button and contribute.

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NEW MODELING SCENARIOS PUBLISHED IN SIMIODE

Your colleagues have been producing new SIMIODE Modeling Scenarios and you might consider using them in your teaching. We list a few here

- [Fastpitch](#) is just that, a look at measuring the speed of the ball in Major League Baseball in order to determine who has the fastest pitch. Erich McAlister of Fort Lewis College in Durango CO USA offers up this material for your consideration.
- Jakob Kotas of Menlo College, Atherton CA USA challenges us to consider [projectile motion in which gravity changes](#) depending upon altitude - think space launches!
- Closer to home Jake Duncan of Winona State University, Winona MN USA challenges with data collection using a phone camera and brick wall background to measure and model [falling darts](#).
- Jennie D'Ambrose of SUNY Old Westbury, Old Westbury NY USA brings SIMIODE Modeling Scenarios from differential equations into Calculus I (really!) with [cancer growth modeling](#) and taking our iconic [spread of oil slick](#) in the Calculus I environment.
- And there are many more for your consideration. Some 20 added in the last few months and the chestnuts in place continue to support modeling in teaching differential equations.

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PUBLISH YOUR CLASS EFFORTS IN SIMIODE

If you are teaching differential equations of some sort you have probably written and assigned projects. Consider publishing your materials online in SIMIODE using our peer reviewed, double blind referee system. More and more colleagues are accepting our invitation for sharing and publishing their teaching materials in SIMIODE for others to enjoy. Join in with us!

SIMIODE maintains a [double-blind, peer-reviewed process](#) for quality online publication of Modeling Scenarios and Technique Narratives. However, we encourage authors to submit their ideas at any stage of development and/or class projects for immediate feedback of a less formal nature. We will render constructive support and encouragement as well as technical feedback. In the past the SIMIODE Director, Brian Winkel, as Founding Editor of the journal *PRIMUS*, found this to be a very good way to foster confidence, help prospective authors contribute to the broader community, and get their ideas published. Please drop us a note with your ideas and/or materials to Director@simiode.org. We will respond quickly!

You can see how to submit your materials [here](#). What you do is important to your students, but it is also worthy of sharing with colleagues and their students. Step up and write up your projects for SIMIODE. You will have an online refereed publication at SIMIODE. You will be pleased to know others are using your ideas, building on your success, and enjoying what you share with your students. So, what are you waiting for? Just do it!

One purpose of SIMIODE is to offer colleagues solid, refereed teaching material on which they can base a modeling first course in differential equations. Thus publishing your new ideas and activities for students is a main objective of SIMIODE so others can see your fine work and engage their own students in similar manner. However, it is reasonable to ask yourself, "Why should I prepare, submit, and publish in SIMIODE?" [Here](#) we give you many good reasons to publish in SIMIODE. Check them out and see that many fit you. Then join us by sending us your efforts.

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WORDS FROM THE DIRECTOR

SIMIODE is a [community](#) which is alive, vibrant, and rich in resources and individual talents to assist colleagues who wish to teach differential equations using modeling to motivate students. There are a number of ways you can add to the community:

Contribute materials. You can learn more about this at our [Author Information](#) section and get even more details once you have signed into SIMIODE. There you will find types of materials and instructions on how to contribute and begin the process leading to publication in

SIMIODE. Register to referee and review submitted materials. Good scholarship merits attention and our double-blind, peer-referee system affords quality reviews of submitted materials.

Post slides from your presentations, classes, or talks. When you give a talk you can post your slides, details of the talk or meeting, and comments at [Resources: Presentations](#). Now that you have spread the word beyond the SIMIODE community bring it back home for your fellow SIMIODE members to see. As always please let us hear from you with your concerns, your news, and your activities. Contact us at Director@SIMIODE.org.
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