CODEE : *Past, Present, Future*

Community of Ordinary Differential Equations Educators

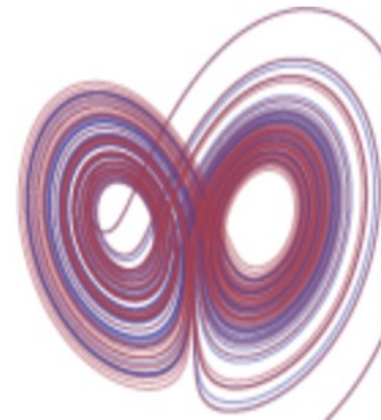**Beverly West**

Cornell University

Samer Habre

Lebanese American University

Maila Hallare

United States Air Force Academy

codee.org

SIMIODE EXPO 2024

CODEE was funded in the early 1990s when Bob Borrelli and Courtney Coleman applied to the NSF for a grant to set up a **Consortium for Ordinary Differential Equations with Experiments (CODEE).**

Harvey Mudd College,
Cornell University,
Rensselaer Polytechnic University,
Washington State University,
St. Olaf College,
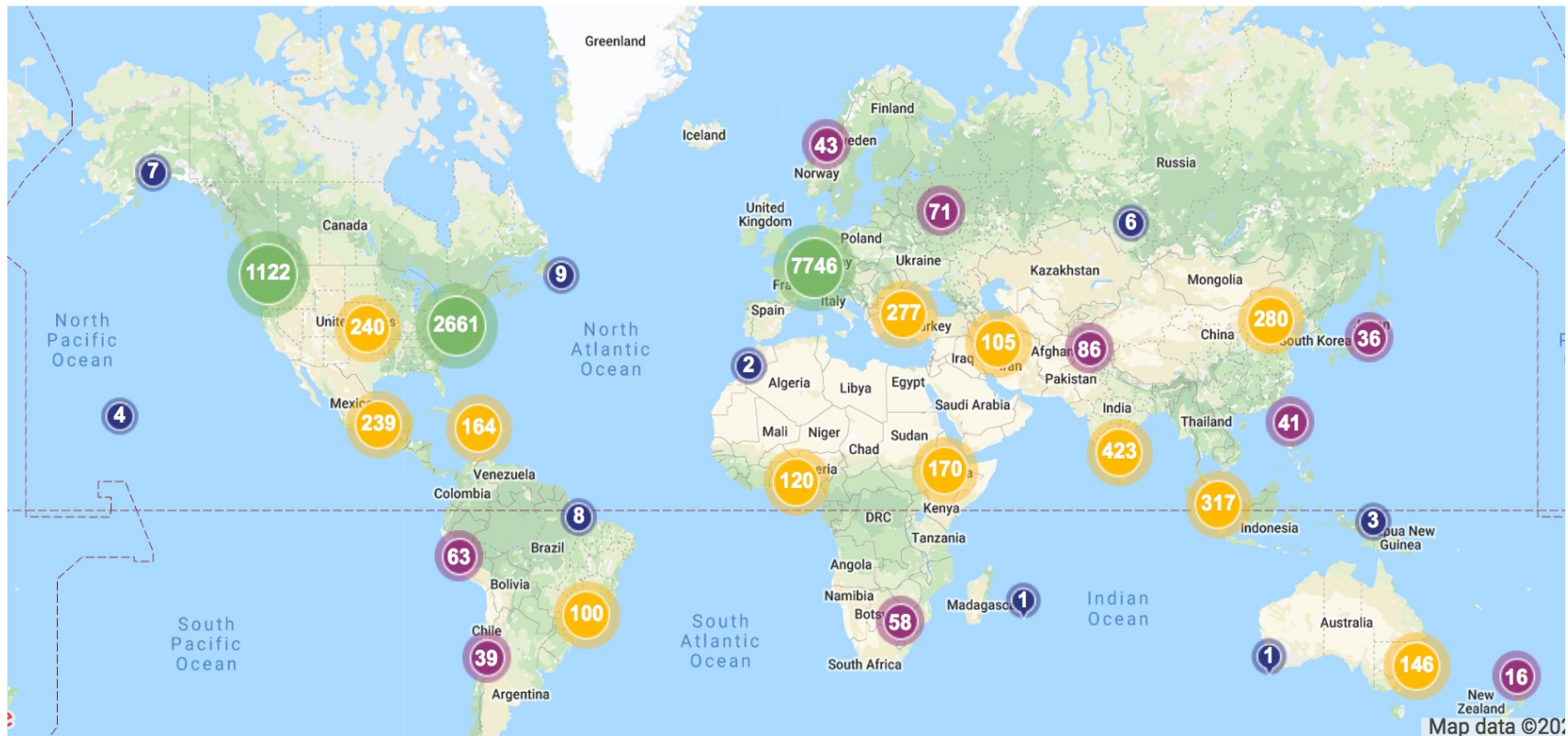West Valley Community College;
Stetson University

Bob Borrelli

Courtney Coleman

2010: CODEE Journal, at codee.org

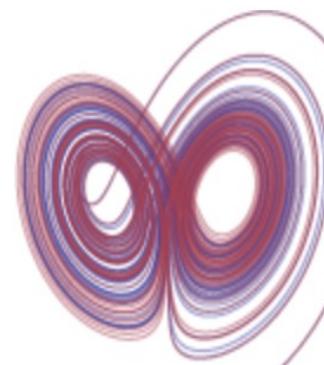Free, open access, online journal, with global impact.

Presenting the third special issue of the CODEE Journal

Engaging the World:
Differential Equations
Can
Influence Public Policies

codee.org

Samer Habre

Lebanese American University
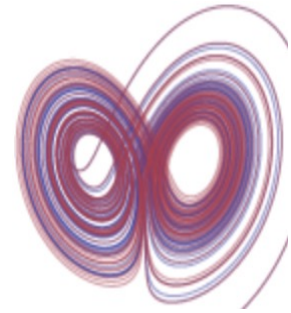
Beverly West
Cornell University

CODEE: Community of
Ordinary Differential
Equations Educators

Category I:
Epidemic- related papers

1. To Open or Not to Open: Developing a COVID-19 Model Specific to Small Residential Campuses –
   Christina J. Edholm, *Nicole L. Falicov*, *Maryann E. Hohn, Lily N. Wartman*, *Emily Y. Lee*, *Ami E. Radunskaya*

2. Applying the SIR model: can students advise the mayor of a small community? -
   Carrin Goosen, *Mark Ian Nelson*, *Mahime Watanabe*

3. Fitting a COVID-19 Model Incorporating Senses of Safety and Caution to Local Data from Spartanburg County, South Carolina -
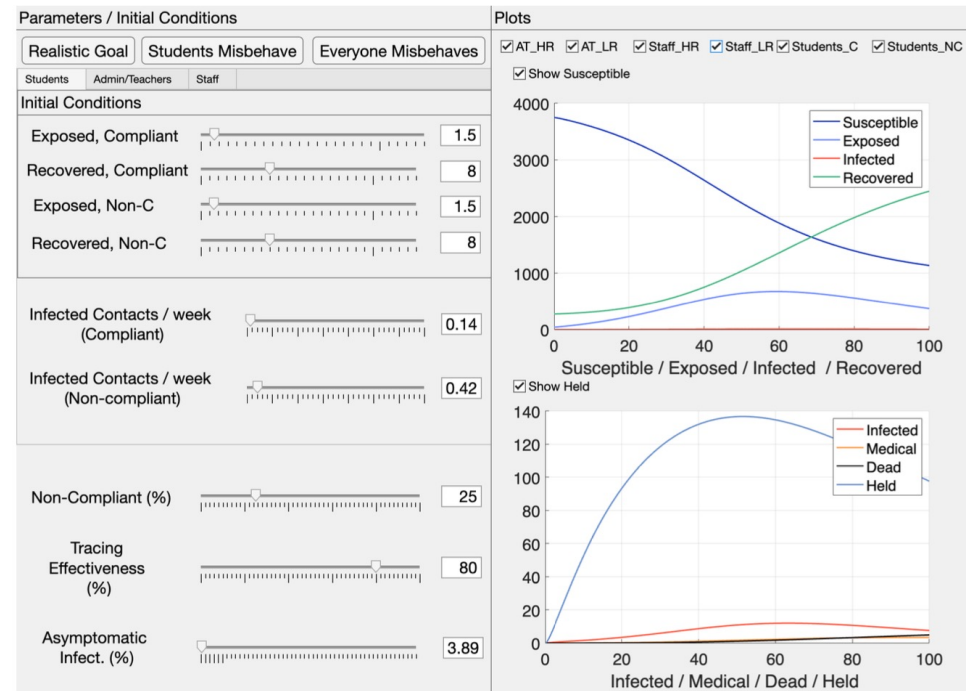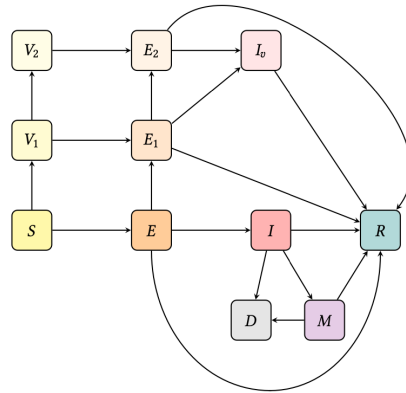   *D. Chloe Griffin*, *Amanda Mangum*

1 *To Open or Not to Open: Developing a COVID-19 Model Specific to Small Residential Campuses*

Christina J. Edholm
Nicole L. Falicov
Lily N. Wartman
Scripps College

Maryann E. Hohn
Institute for Defense Analyses, Center for Computing Sciences

Emily Y. Lee
Claremont McKenna College

Ami E. Radunskaya
Pomona College

Applying the SIR model: can students advise the mayor of a small community?

Carrin Goosen, Mark Ian Nelson

School of Mathematics and Applied Statistics, The University of Wollongong, Wollongong, New South Wales 2522, AUSTRALIA

Mahime Watanabe

*School of Education, The University of Wollongong, Wollongong, New South Wales 2522, AUSTRALIA*
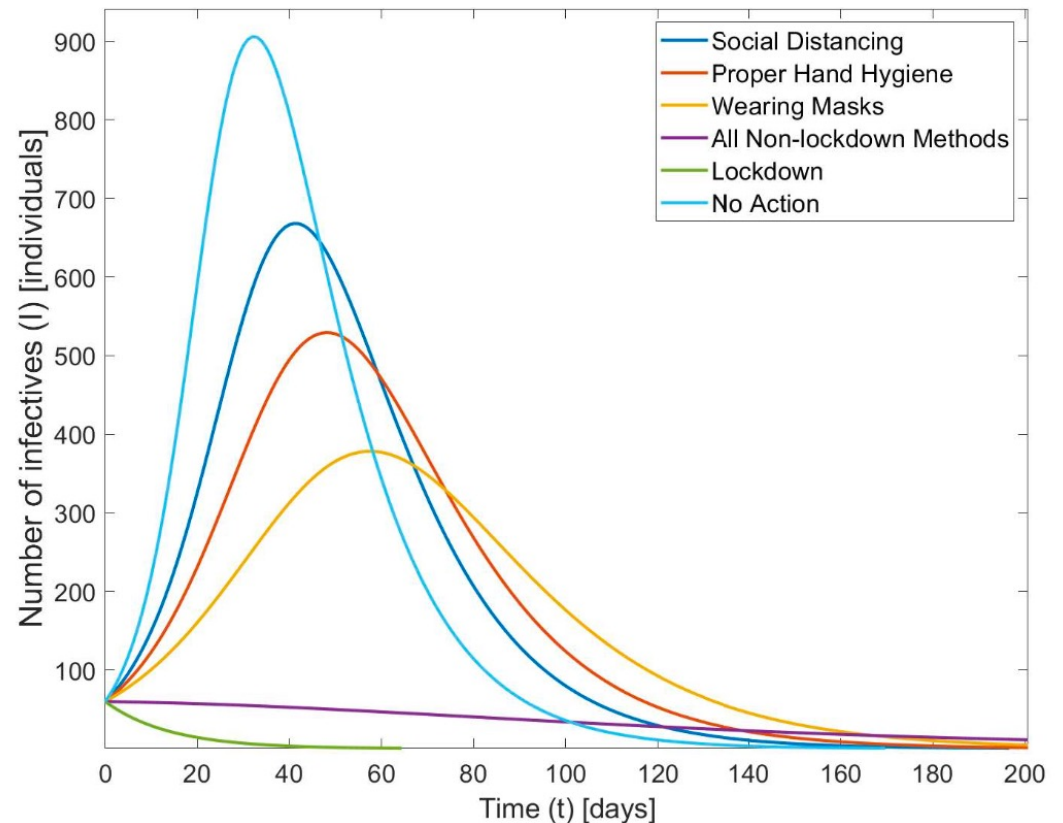
3 Fitting a COVID-19 Model Incorporating Senses of Safety and Caution to Local Data from Spartanburg County, South Carolina

D. Chloe Griffin

Brown University, Providence, RI, USA

Amanda Mangum

Converse University, Spartanburg, SC, USA

Comparison of USA Facts and SC DHEC Data (Daily Cases)
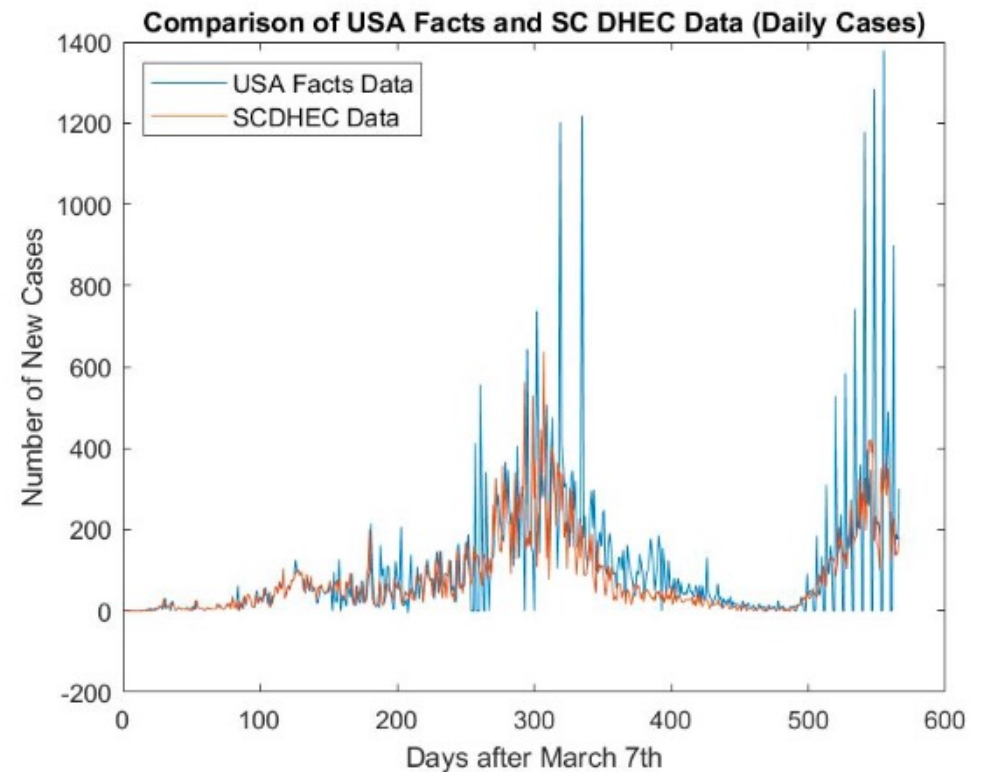
Category II:
Engaging students in the classroom

4. Differential Equations for a Changing World: How to Engage Students in Learning and Applying Differential Equations –

   Biyong Luo.

5. Utilizing Writing Assignments with Differential Equations to Raise Student Awareness of Environmental Issues –
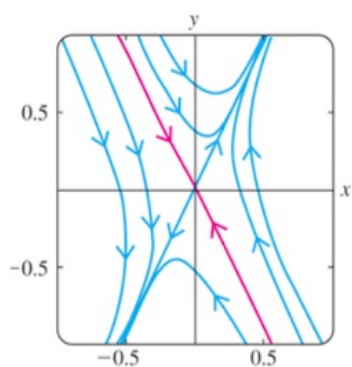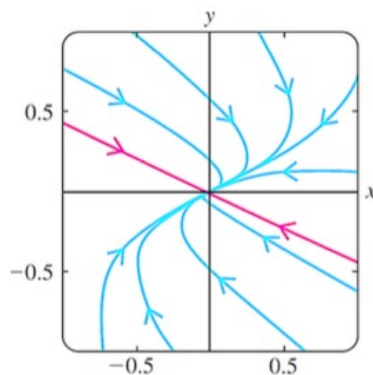
   Michelle Ghrist
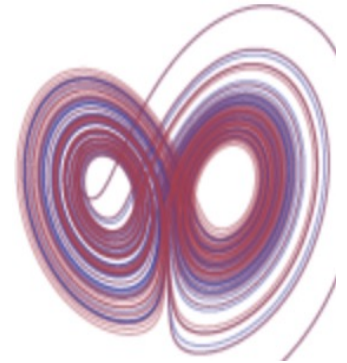
4 Differential Equations for a Changing World: How to Engage Students in Learning and Applying Differential Equations
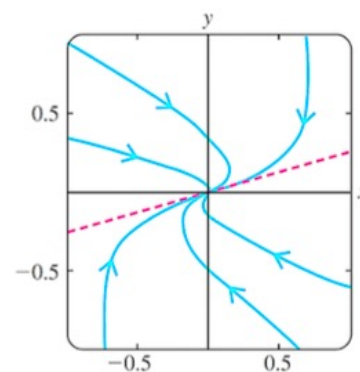
Biyong Luo

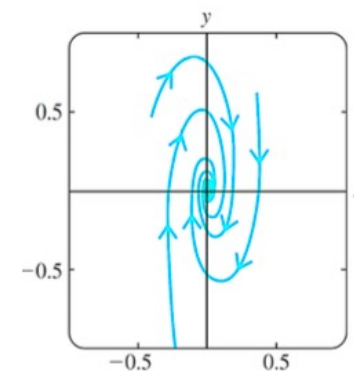*University of Massachusetts Dartmouth, Dartmouth, MA, USA*

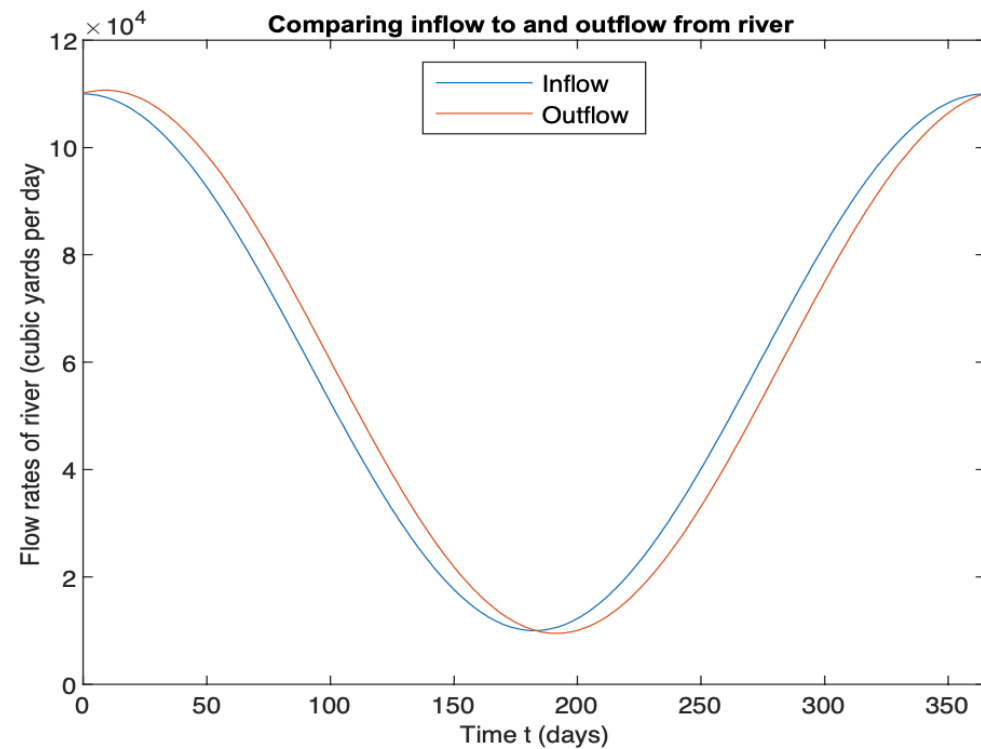(a) $c = 4$ (b) $c = \frac{1}{4}$ (c) $c = 0$ (d) $c = -9$

5 Raising Student Awareness of Environmental Issues via Writing Assignments with Differential Equations
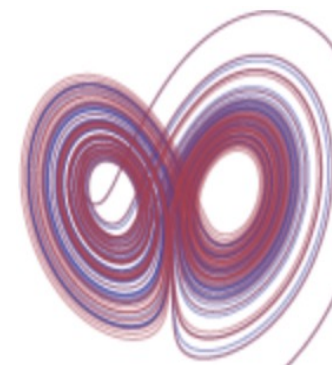
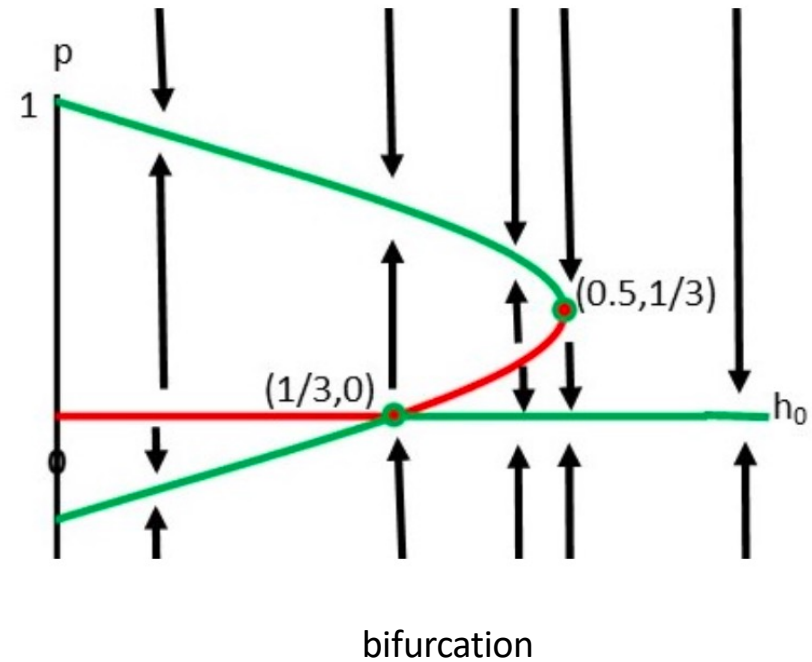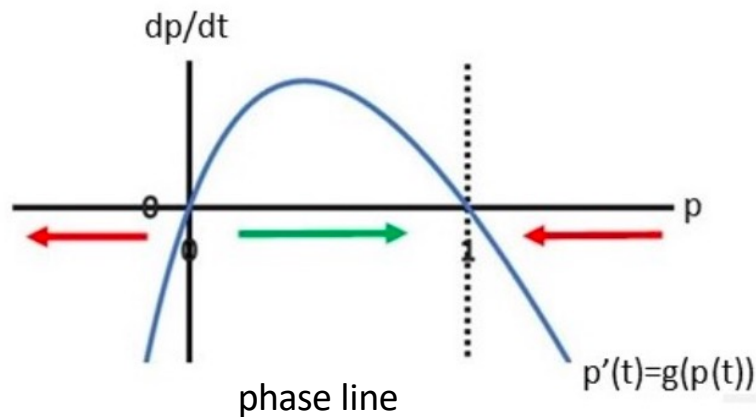Michelle Ghrist

Gonzaga University, Spokane, WA, USA

Category III: **Population dynamics**

6. Population Growth Models: Relationship between sustainable
   fishing and making a profit
   - *James Sandefur*.

7. Blue Whale and Krill Populations Modeling
   – *Li Zhang*.

8. Nonlinear Dynamics of Mountain Pine Beetle Populations:
   Discussion of Forestry Policy, a Survey of Existing Mathematical
   Models, and Code Base Demonstration
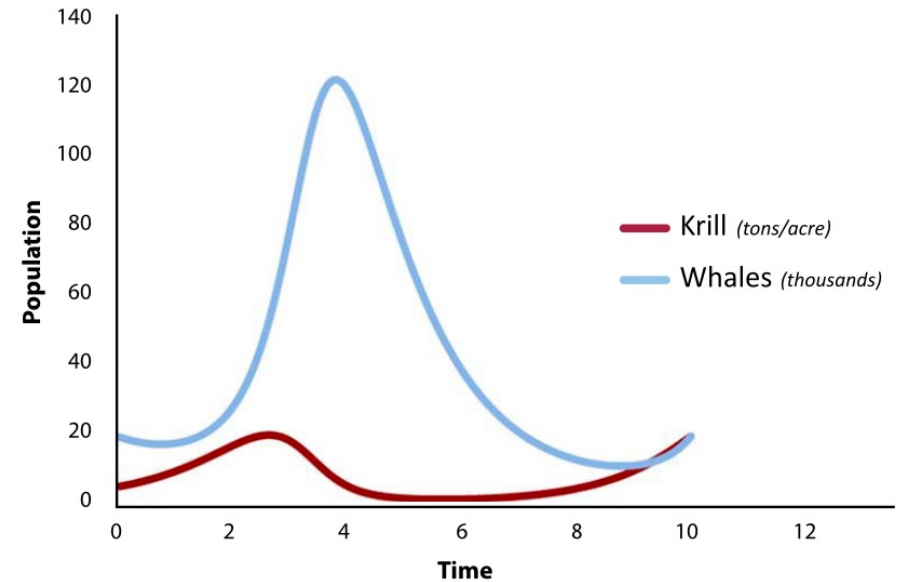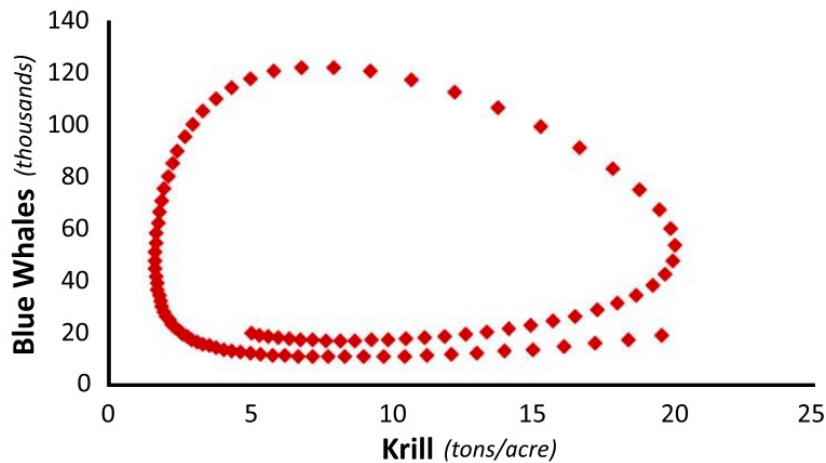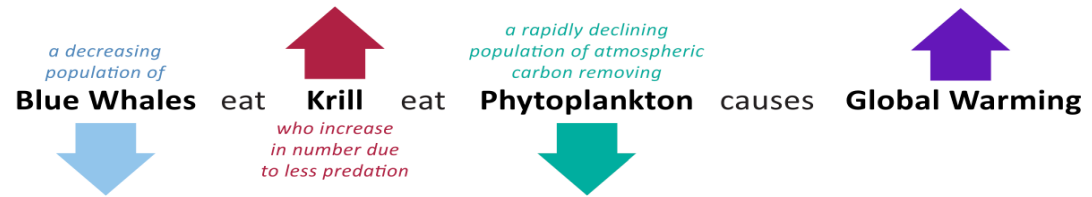   - *Scott A. Strong*, *Maya Maes-Johnson*.

Population Growth Models: Relationship between sustainable fishing and making a profit

James Sandefur

Georgetown University, Washington, DC, USA

phase line

bifurcation

Blue Whale and Krill Populations Modeling

Li Zhang
The Citadel

a decreasing population of **Blue Whales** eat **Krill** *who increase in number due to less predation* eat **Phytoplankton** *a rapidly declining population of atmospheric carbon removing* causes **Global Warming**

8 *Nonlinear Dynamics of Mountain Pine Beetle Populations: Discussion of Forestry Policy, a Survey of Existing Mathematical Models, and Code Base Demonstration*

Scott A. Strong, Maya Maes-Johnson, *Colorado School of Mines*
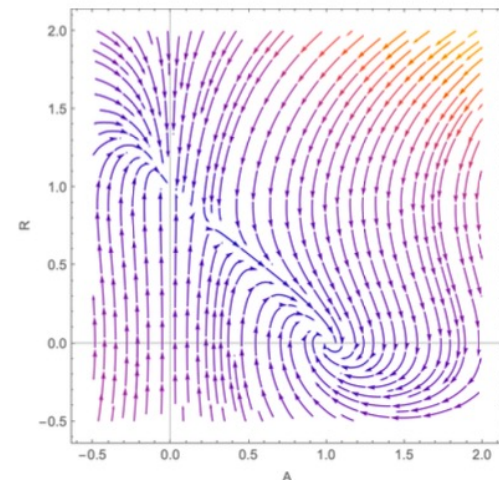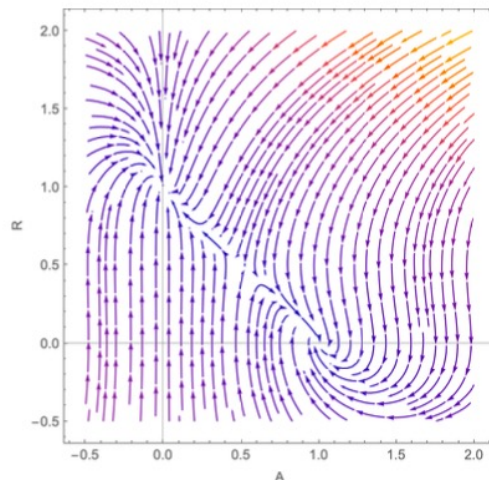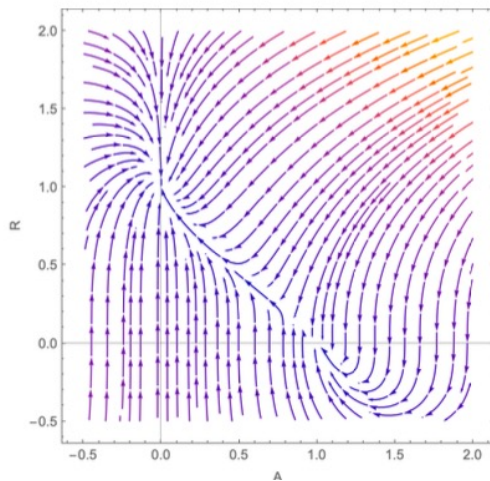
Category IV: **Other models**

9. Modeling Aircraft Takeoffs
   - *Catherine Elizabeth Cavagnaro*.

10. ODE models of wealth concentration and taxation
    - *Bruce Boghosian and Christoph Börgers*.

11. ODEs and Mandatory Voting
    - *Christoph Börgers, Natasa Dragovic, Anna Haensch, Arkadz Kirshtein, Lilla Orr*.

12. Solar Panels, Euler's Method and Community-based Projects: Connecting Differential Equations with Climate Change
    - *Victor Donnay*.

13. Using a Sand Tank Groundwater Model to Investigate a Groundwater Flow Model
    – *Michael A. Karls, Christopher Evrard*.
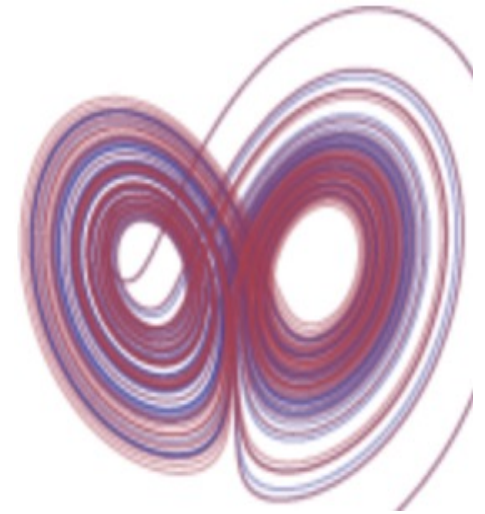
Modeling Aircraft Takeoffs

Catherine Elizabeth Cavagnaro

Sewanee: The University of the South
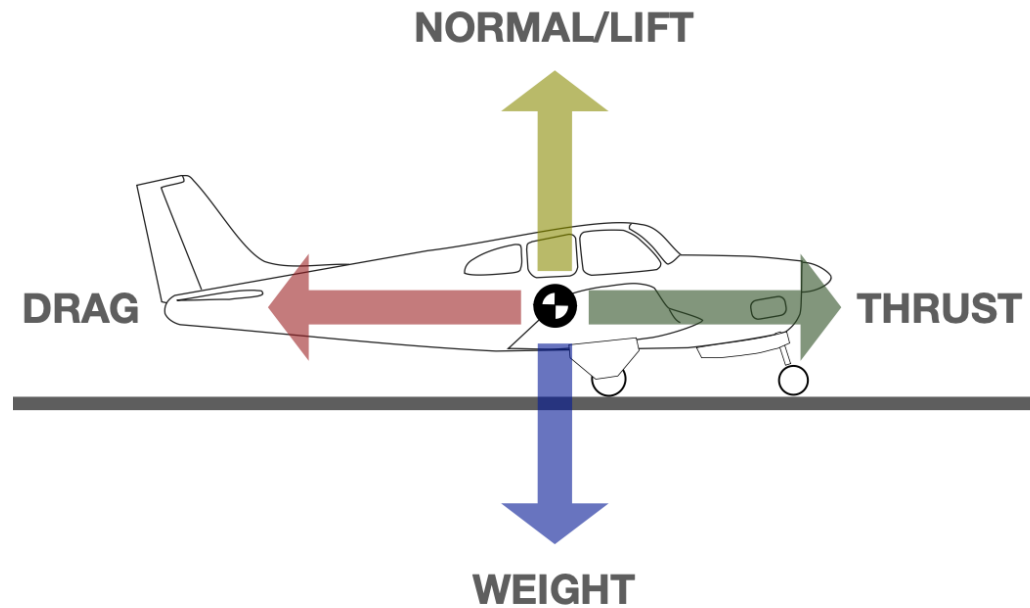
ODEs and Mandatory Voting

Christoph Börgers
Tufts University, Medford, MA, USA

Natasa Dragovic
University of St. Thomas, St. Paul, MN,
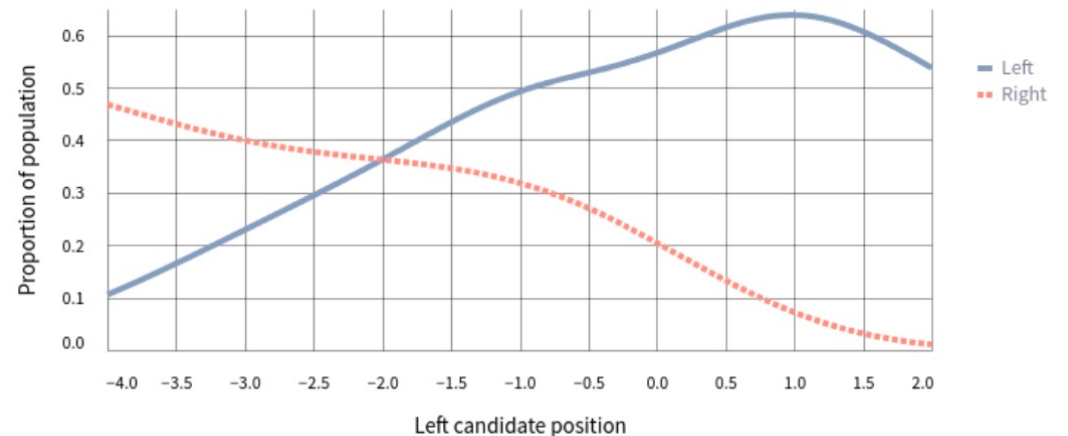
Anna Haensch
Tufts University, Medford, MA, USA

Arkadz Kirshtein
Tufts University, Medford, MA, USA

Lilla Orr
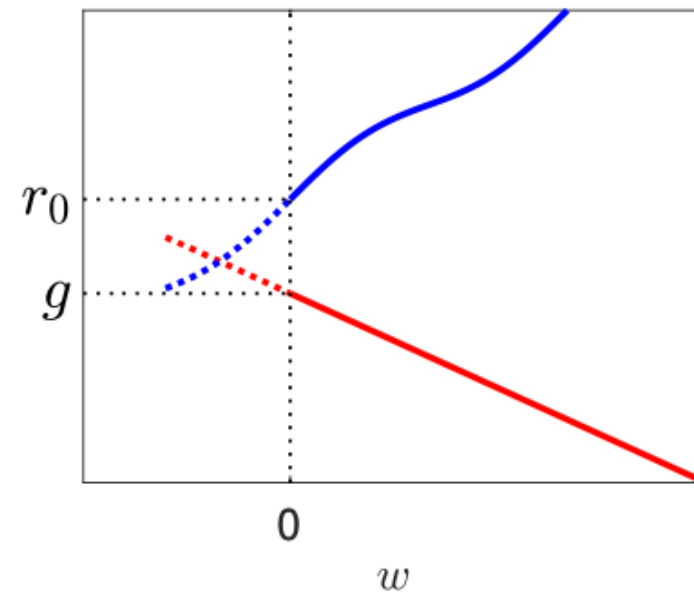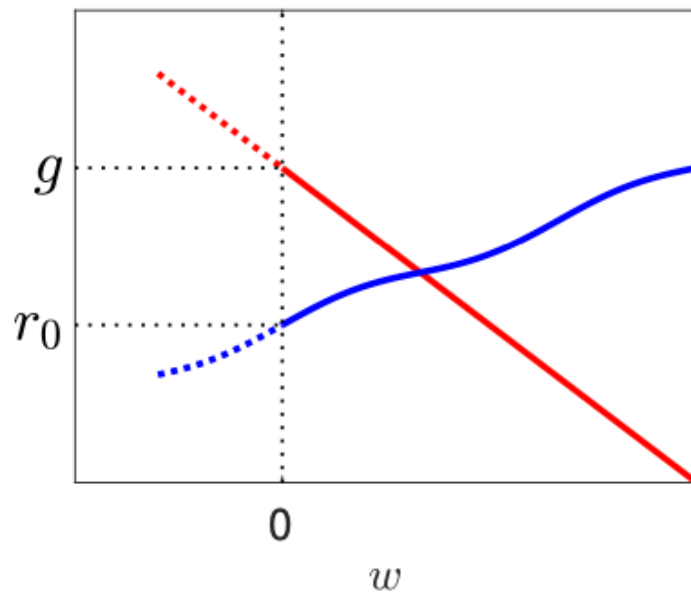*University of Richmond, Richmond, VA, USA*

Proportion of Population Voting for Each Candidate as a Function of Position with Voter Loyalty 3.0

11 *ODE models of wealth concentration and taxation*

Bruce Boghosian and Christoph Börgers

Department of Mathematics, Tufts University, Medford, Massachusetts

12 *Solar Panels, Euler's Method and Community-based Projects: Connecting Differential Equations with Climate Change*
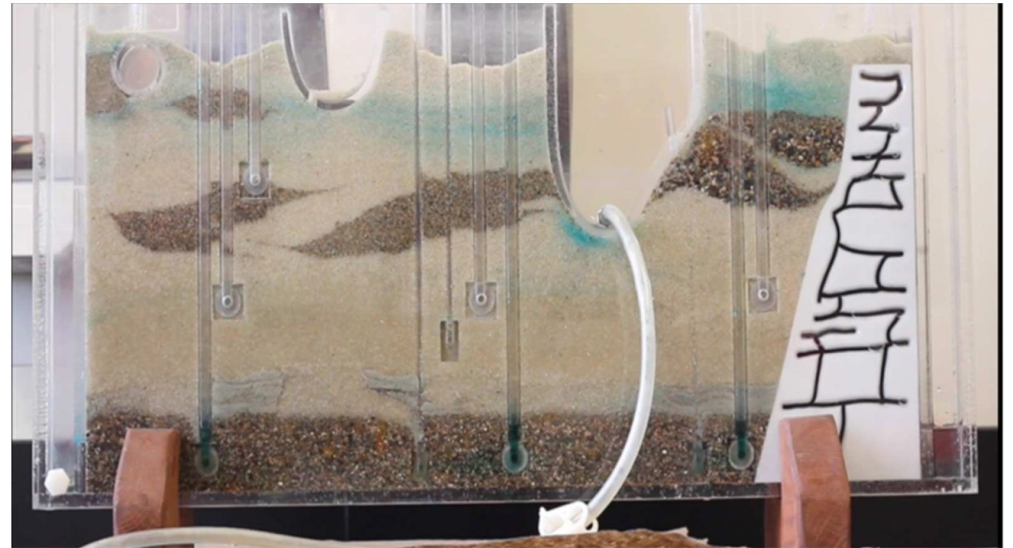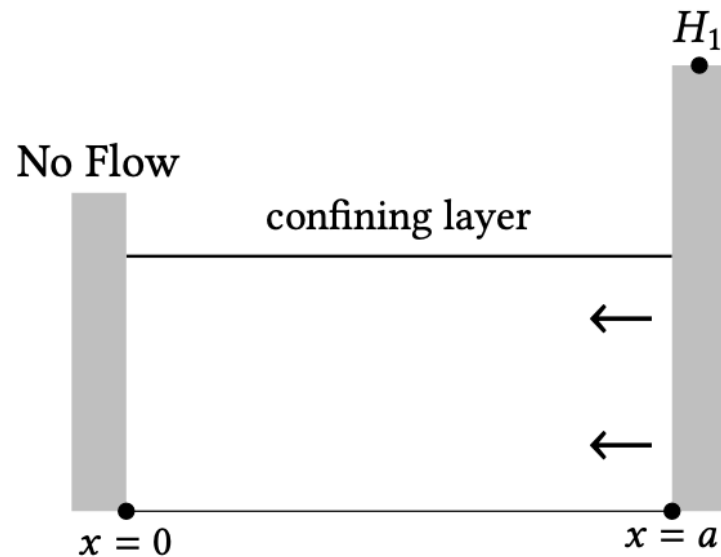
Victor J. Donnay
Bryn Mawr College, Bryn Mawr, PA, USA

13 Using a Sand Tank Groundwater Model to Investigate a Groundwater Flow Model

Christopher Evrard, Callie Johnson, Michael A. Karls, and Nicole Regnier
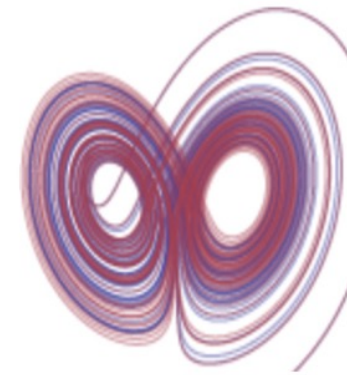*Ball State University, Muncie, IN, USA*

Thank you for listening – Now,

Download,

Read, and

Enjoy!

codee.org

CODEE: Community of Ordinary Differential Equations Educators