

Mathematical Models Projects

1. The Moose and Wolves of Isle Royale
Present a mathematical (spreadsheet) model for the wolf-moose-balsam fir interaction on Isle Royale.
Reference: McLaren, B.E. & Peterson, R.O., *Wolves, Moose, and Tree Rings on Isle Royal*, Science, 266 (1994) 1555-1558.
Links: http://www.ed.mtu.edu/esmis/a_study_of_population_change.htm
http://en.wikipedia.org/wiki/Wolves_and_Moose_on_Isle_Royale
2. The Shortest Route Problem
Present an algorithm for finding the shortest route between two locations on a map.
Reference: Anderson, David R, Sweeny, Dennis J., & Williams, Thomas A., *An Introduction to Management Science: Quantitative Approaches to Decision Making*, 11th Edition, Thompson South-Western, 2005, 429-441
Links: <http://optlab-server.sce.carleton.ca/POAnimations2007/DijkstrasAlgo.html>
<http://www.colorado.edu/education/DMP/activities/graph/ddgact04.html>
3. The Maximal Flow Problem
Present an algorithm to determine the maximum amount of flow that can enter and exit a network system in a given period of time.
Reference: Anderson, David R, Sweeny, Dennis J., & Williams, Thomas A., *An Introduction to Management Science: Quantitative Approaches to Decision Making*, 11th Edition, Thompson South-Western, 2005, 442-445
Link: <http://www.providence.edu/mcs/rbg/mba/maximalflow.ppt>
4. The Spread of an Epidemic (or Rumor)
Present a mathematical (spreadsheet) model for the spread of an epidemic or rumor.
Reference: Neuwirth, E. & Arganbright, D., *The Active Modeler: Mathematical Modeling with Microsoft®Excel*, Thompson Brooks.Cole, 2004, 32-40.
Links: <http://math.smith.edu/Local/cicchap1/node2.html>
<http://www.math.duke.edu/education/ccp/materials/diffcalc/sir/contents.html>
5. Project Scheduling: PERT/CPM
Present a method for planning, scheduling, and controlling activities within a complex project.
Reference: Anderson, David R, Sweeny, Dennis J., & Williams, Thomas A., *An Introduction to Management Science: Quantitative Approaches to Decision Making*, 11th Edition, Thompson South-Western, 458-467.
Link: <http://www.caam.rice.edu/~timredl/caam376/LectureNotes/Lecture27/sld001.htm>