IDEAS FOR DIRECTED READING PROGRAM

INTERDISCIPLINARY PROJECTS

(FALL 2023)

* Modeling and simulation of complex parasitoid-host population systems

Reference:

https://www.colorado.edu/project/mathbio/2018/05/02/host-parasitoid-models

* Modeling and simulation of virus dynamics

Reference:

"Virus dynamics: The Mathematical Foundations of Immunology and Virology"

Martin A. Nowak, Robert May; Oxford University Press; 1st ed, 2001

* Modeling and simulation of chemotaxis models

Reference:

https://people.cs.vt.edu/~ycao/labweb/chemotaxis/chemotaxis.html

* Auto-regulation in gene regulatory networks

Reference:

"Evolutionary Computation in Gene Regulatory Network Research"

Hitoshi Iba, Nasimul Noman; Wiley; 2016

* Reliance of scale-free networks

Reference:

https://en.wikipedia.org/wiki/Scale-free_network

* Simulation of random particle movement

References:

https://www.stat.berkeley.edu/~aldous/Research/OP/river.pdf

https://arxiv.org/abs/1512.04493

* Mathematical models for maritime wildlife

References:

Swanson, Courtney, "Understanding Changes in Marine Communities Through a Discretized, Size-

Structured Matrix Model" (2021). Senior Seminars and Capstones. 3.

https://digitalcommons.morris.umn.edu/capstone/3

"An ODE Model of the Motion of Pelagic Fish"

Bjorn Birnir; Journal of Statistical Physics 128(1):535-568 (2007)

DOI:10.1007/s10955-007-9292-2

* Biological transport processes in cells

Reference:

"Principles and Models of Biological Transport"

Morton H. Friedman, Springer

* Other -- let us know what projects you'd like to pursue!