Introduction

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Overview/logistics

- applied focus
- all class materials at `https://github.com/bbolker/stat744`
- class-led, in pairs
  - Monday: lecture
  - Thursday: practical exercise
- topics

Big picture

- dynamical models
- involve both *process* and *observation* error/noise

time	process	state	space	model
continuous	deterministic	continuous		ODE
continuous	stochastic	continuous		stochastic ODE
continuous	deterministic, stochastic	continuous		difference equation
discrete	stochastic	discrete		Markov process
continuous	stochastic	discrete		continuous-time MP

- nonlinearity
- variance changes unpredictably
- non-Gaussian
- constrained bounds *to* generalized linearity
- variances don't add predictably

Simulation

- import for

- need `for` loops, can rarely vectorize
- `deSolve` package for ODEs
- stochastic ODEs: code your own Euler-Maryuma (easy) or Milstein, or use something from Darren Wilkinson's smbfs package [`library("sos"); findFn("maruyama")`].