Lecture on Proxels

- two different views
  - simple SPN one transition F exp(lambda) from A to B
  - Simulation people: DES - samples of state jumps
  - mathematicians: PDE - continuous probability flow
  - Simple two state / one transition Markov chain
- examples
  - Memorylessness is unrealistic
  - peoples age/lifetime - rate at which people are dying
  - "time dependent food decision (Sushi, Pizza)"
    - example chain
  - weather example
    - sunny cloudy with memory of age
- supplementary variables --> proxels
  - Proxel definition
    - probability element
    - "(State, age, probability)"
    - "((dS,tau),t,R,p) = (state,sim_time,route,probability)"
  - how to determine transition probabilities from IRF
    - dPI/dt=PI*mu(t)
  - generalization to two / multiple transitions
    - reference back to food example
  - simple SPN one transition build example proxel chain
  - discretization of rate function
    - arbitrary accuracy
- variable transition rates
  - Instantaneous rate function IRF / hazard rate function
    - "rate at which the event happens, if it has not happened so far"
    - formula mu(t) = f(t)/(1-F(t))
    - show that for exp is constant
  - variable rate mu(t) - needs to be constant for exponential
  - water tank example with variable crossectional area
  - "examples: Uniform, Normal"
- algorithm example
  - proxel tree
  - resemblance to DTMC ?
  - "two states, A.B two transitions F,G"