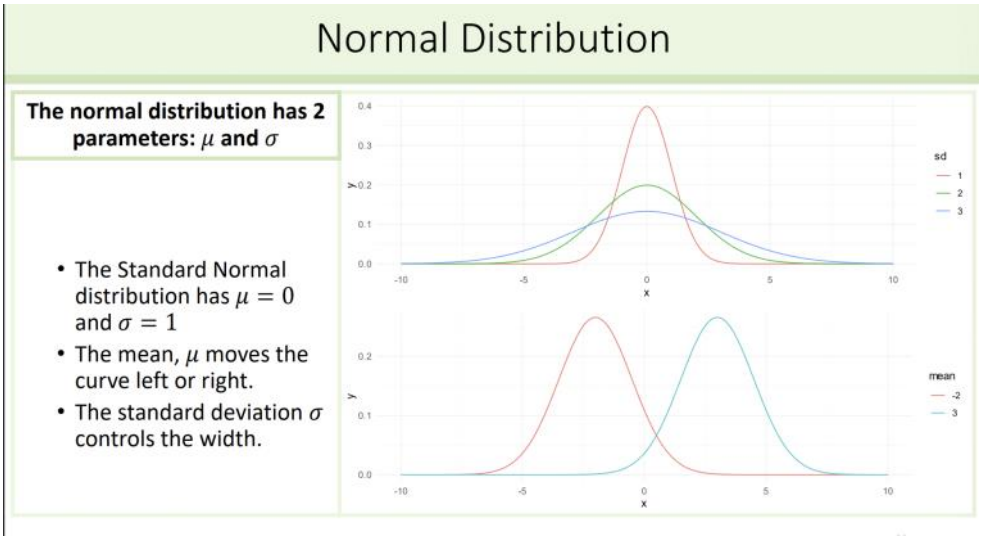
Continuous Sample Spaces

Tuesday, October 4, 2022 8:59 AM

Normal, exponential, and set of key distributions

- Continuous distributions sample space: the *real* numbers
  - All continuous distributions have infinite sample spaces
  - Continuous distributions may have bounded or unbounded sample spaces

Normal Distributions

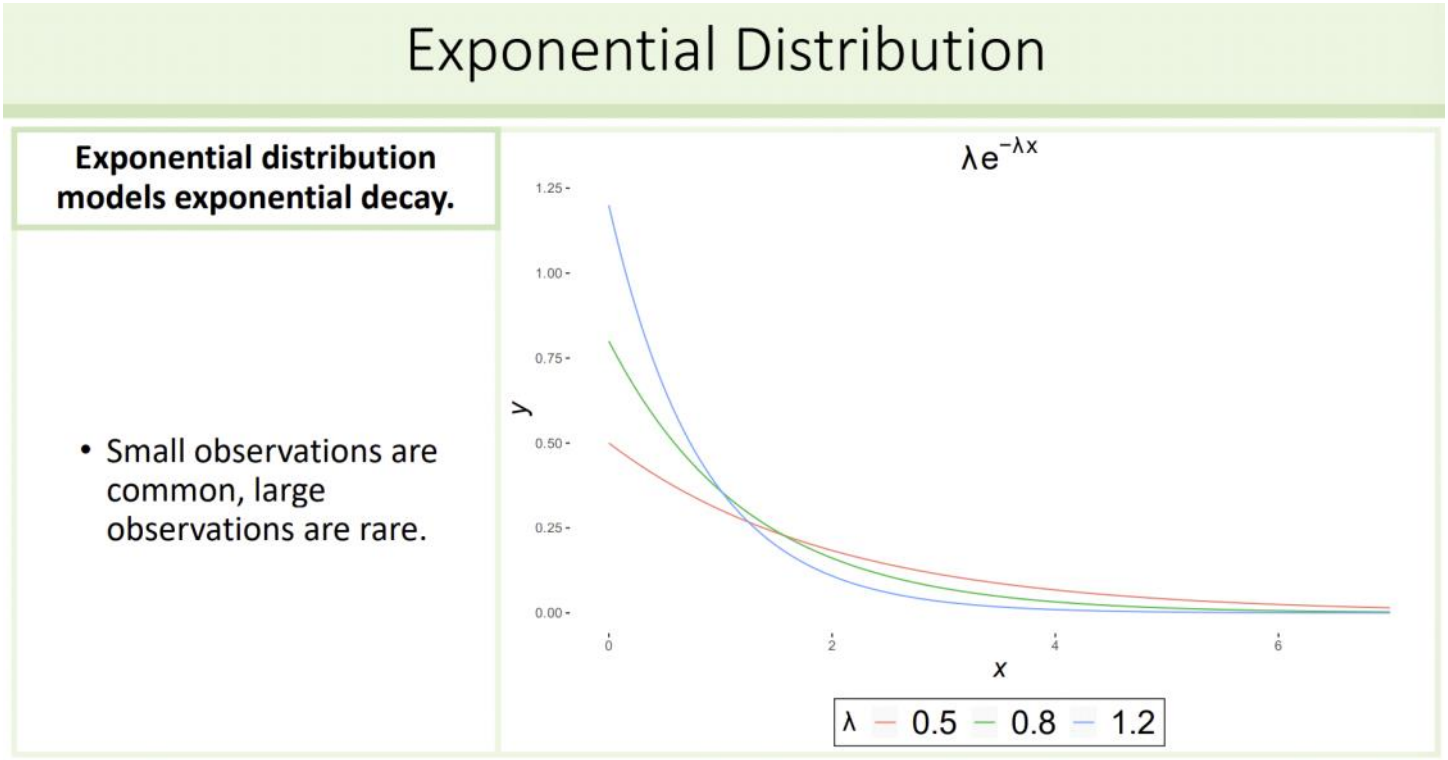


- Two parameters are independent of each other. Can have two distributions with same mean but different standard deviations, for example!

Exponential Distribution

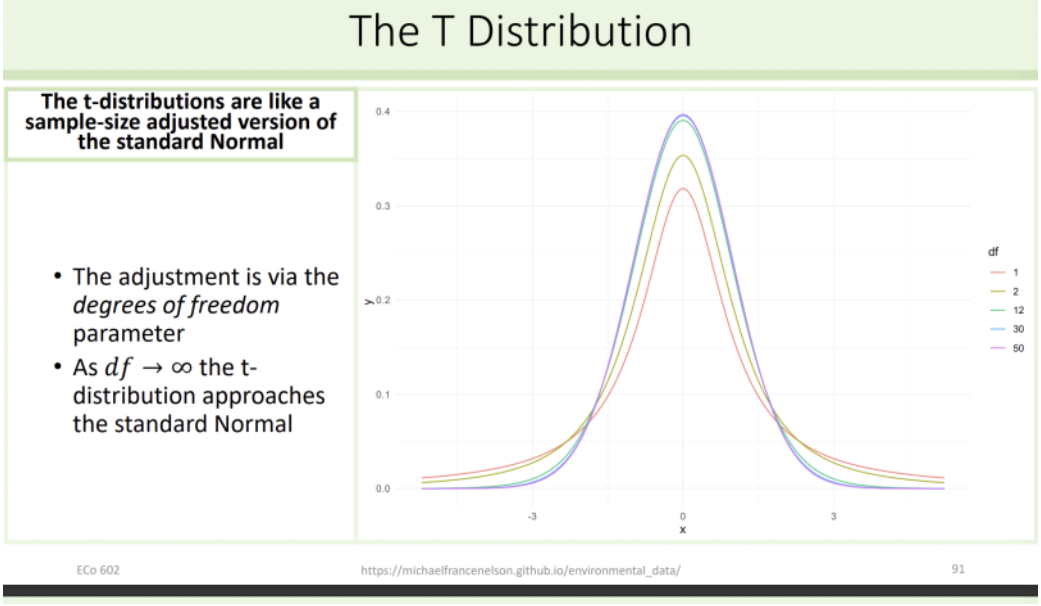
When have lots of small events (like measurements of an organism with fewer and fewer adults) > exponential distribution which shows exponential decay. Good for few large observations and lots small. Sometimes called negative exponential

- Cannot slide back and forth
- Starts and 0 and decreases
- Has single parameter, lambda



The T Distribution

- Degrees of freedom is only parameter
  - Smaller means shorter and fatter tails--more uncertainty, more extreme values
  - *Number of observations (sample size) minus one for T distribution*
    - For different scenarios, subtract 2 from sample size when calculate 2 quantities.
- Adjustment is via the degrees of freedom parameter
- As df approaches the infinite the T distribution approaches the standard normal
- Helps describe stochastic part of model (all of these distributions)
- Like finite sample size for normal distribution



Other components of distribution: Skew and Kurtosis (measured in reference to normal distribution)

- **Skew**: amount of asymmetry in distribution
    - Exponential has right skew
    - T has no skew
- **Kurtosis**: measure of pointiness
    - *Platykurtotic:* flat with short tails, extreme events are less common
        - Too flat
    - *Leptokurtotic:* pointy with long tails, extreme events are more common
        - Too pointy