

EMD 538 - Lecture 01

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Probability Distributions

- Discrete versus continuous etc
- PDF vs CDF
 - PDFs (for discrete it's a mass function) and is the probability that the variable X takes on exactly some value x
 - * goes to 0 as $x \rightarrow \infty$
 - CDF is the probability that the random variable X is less than or equal to some value x
 - * goes to 1 as $x \rightarrow \infty$
 - the integral of the PDF gives us the CDF
 - Notation:

$$F(x) = \int_{-\infty}^x f(u)du$$

Discrete Probability Distributions

- Bernoulli
- Binomial
- Multinomial

- probability of exactly x_i outcomes of type i in n independent trials, where p_i is the probability of success in a single trial of type i
 - *this is a generalization of the bernoulli distribution for more than 2 possible outcomes*
- Geometric
- Negative Binomial
- Poisson

Normal Distribution

- Normal (Gaussian)
- Exponential
 - distribution of time between events occurring independently at a constant rate λ