01/27/2026: Discrete Random Variables (Part 1)

CSCI 546: Diffusion Models

Textbook reference: Sec 3.1-3.5

Announcement (Sign-in Sheet)

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Announcement (Office Hours)

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Announcement (Group exercises)

Group exercises will be posted to the course repo after class. Please continue working on what you don't finish in class.

Bayes Law Practice

Review Problem Set #3

Binomial Distribution

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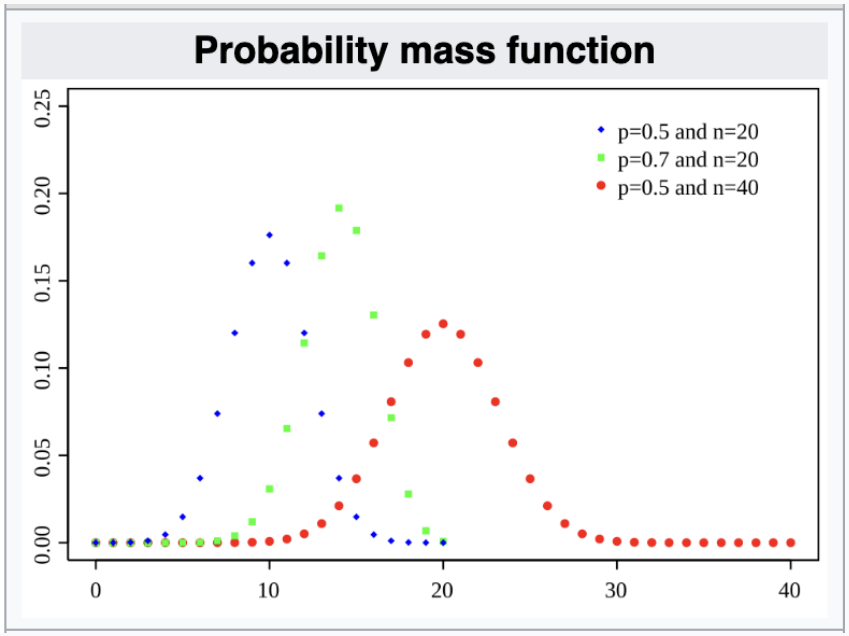

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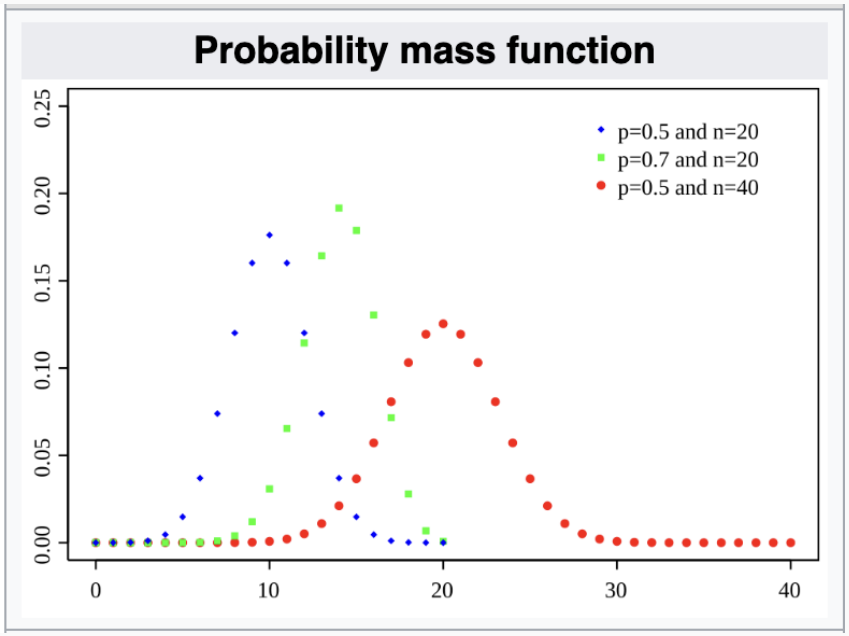

$$P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$$

Poisson Distribution

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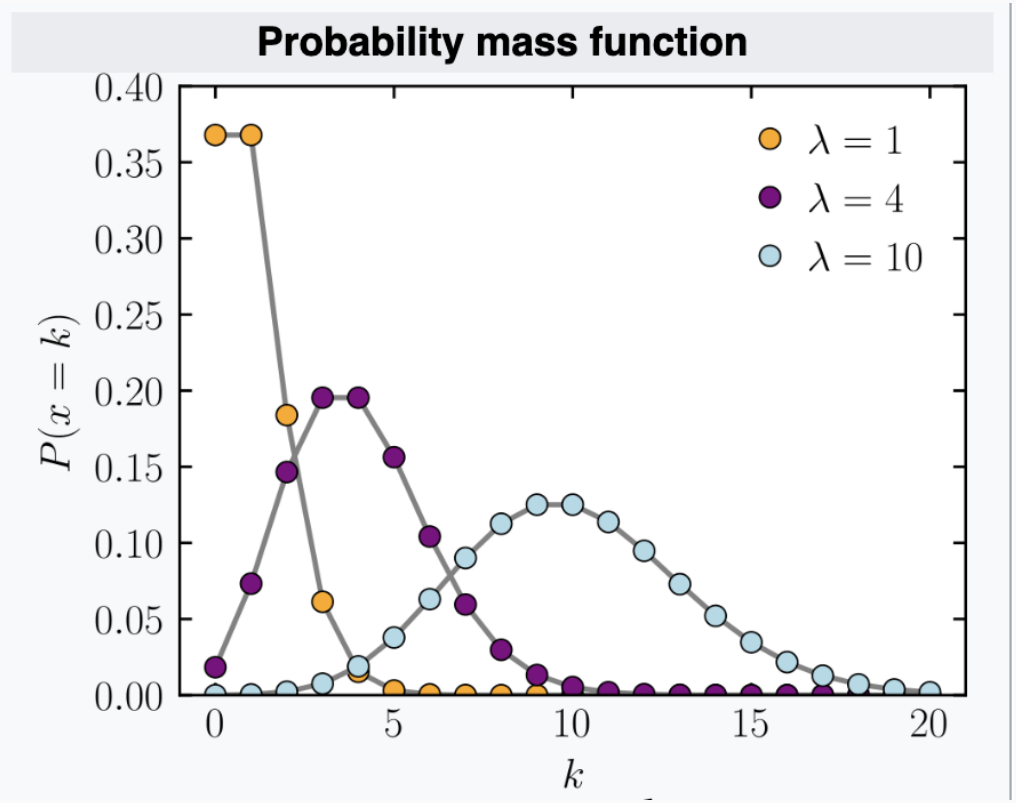

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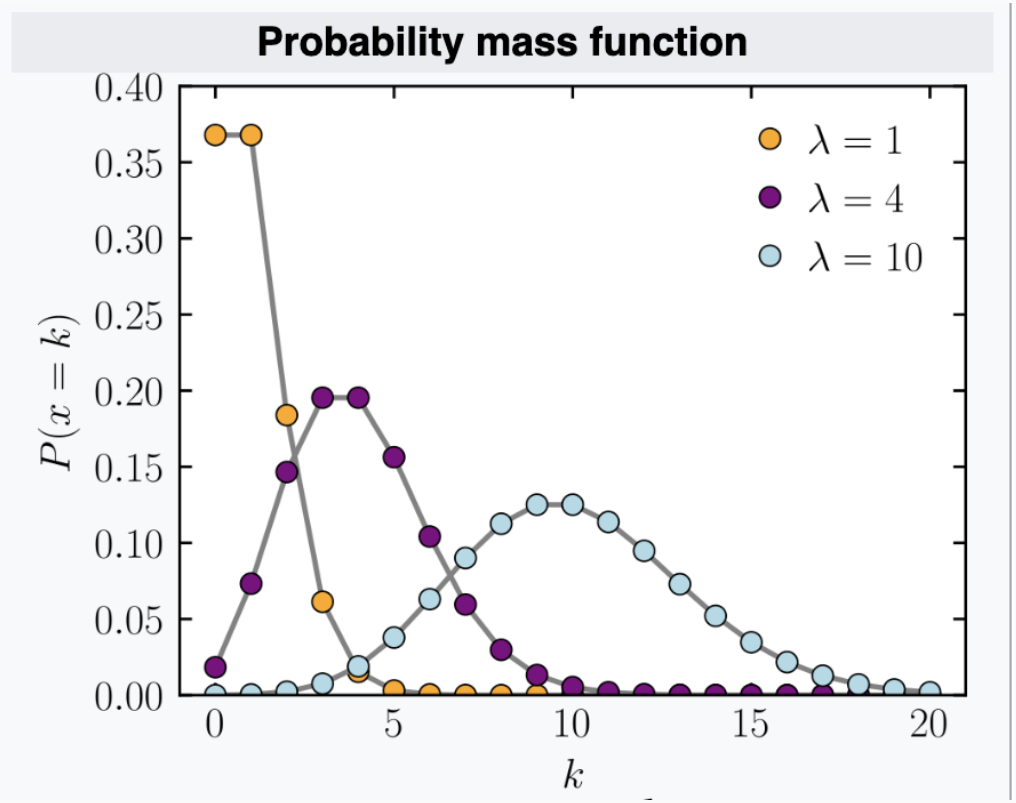

$$P(X = k) = \frac{\lambda^k}{k!} e^{-\lambda}$$

Random Groups

Aubrey Williams: 5
Austin Barton : 2
Blake Sigmundstad: 1
Diego Moylan: 6
Dillon Shaffer: 3
Felicia Jayasaputra: 1
Ismoiljon Muzaffarov: 7
Jacob Tanner: 4
Josh Stoneback: 2
Joshua Bowen: 3
Joshua Calwell: 5
Laura Banaszewski: 1
Lina Hammel: 8
Logan Racz: 8
Matt Hall: 7
Micah Miller: 4
Mike Kadoshnikov: 2
Owen Cool: 6
Racquel Bowen: 4
Samuel Mocabee: 5
Tatiana Kirillova: 3

Group exercises - Problem Set 4

1. (3.2.1) Let X and Y be independent random variables, each taking the values -1 and 1 with probability $\frac{1}{2}$, and let $Z = XY$. Show that X, Y and Z are pairwise independent. Are they independent?
2. (3.5.2) In your pocket is a random number N of coins, where N has the Poisson distribution with parameter λ. You toss each coin once, with heads showing with probability p each time. Show that the total number of heads has the Poisson distribution with parameter λp.