

Probability and Random Processes

ECS 315

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12 Limiting Theorems



Office Hours:

BKD, 6th floor of Sirindhralai building

Tuesday 9:00-10:00

Wednesday 14:20-15:20

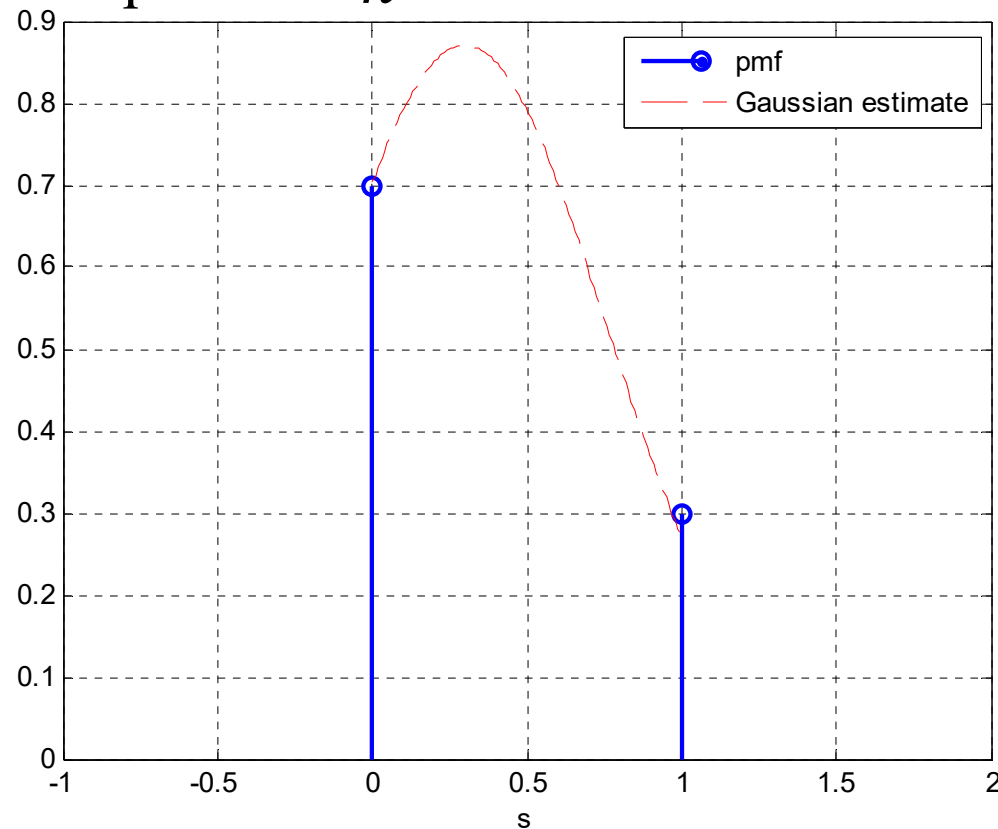
Thursday 9:00-10:00

Sum of n Bernoulli RVs

- Let
 - X_1, X_2, \dots be i.i.d. Bernoulli(p).
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .

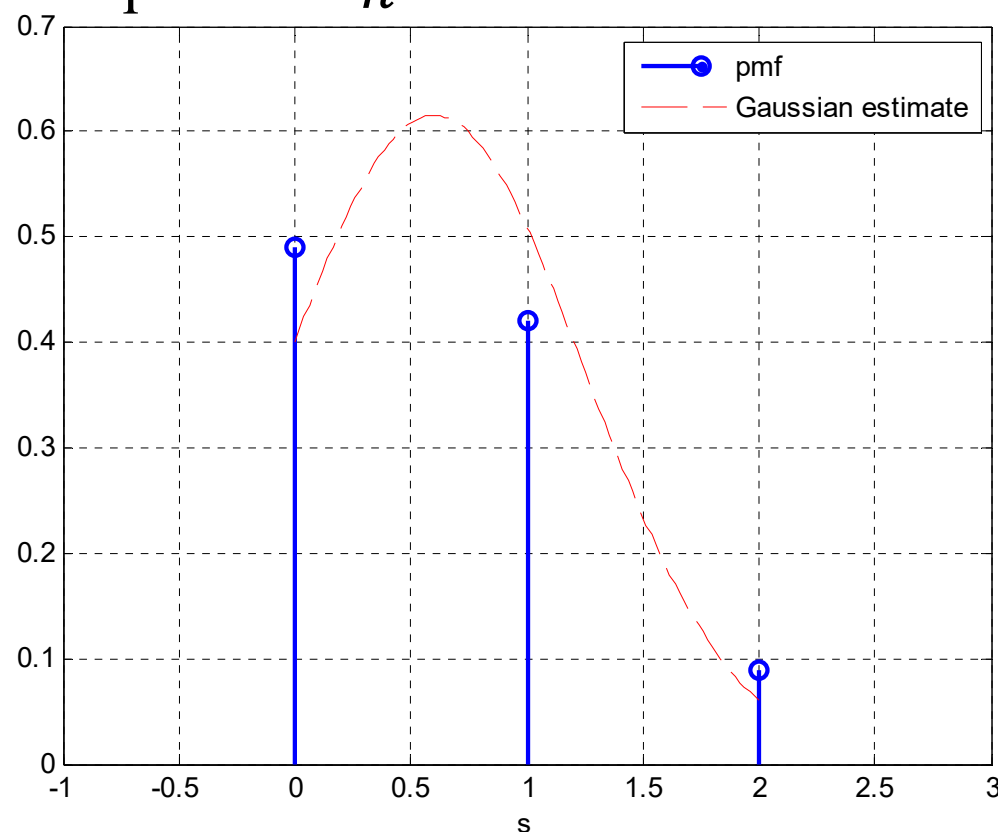
A Bernoulli RV

- Let
 - X_1, X_2, \dots be i.i.d. Bernoulli(p).
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .
- $n = 1$:



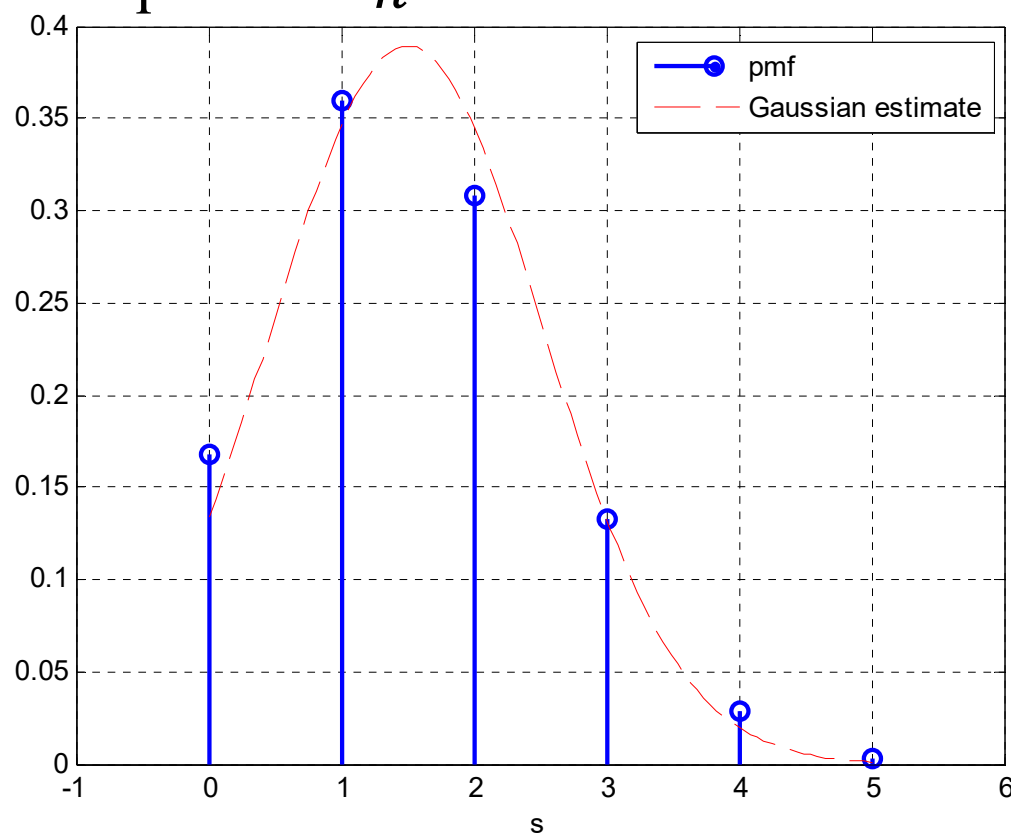
Sum of *two* Bernoulli RVs

- Let
 - X_1, X_2, \dots be i.i.d. Bernoulli(p).
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .
- $n = 2$:



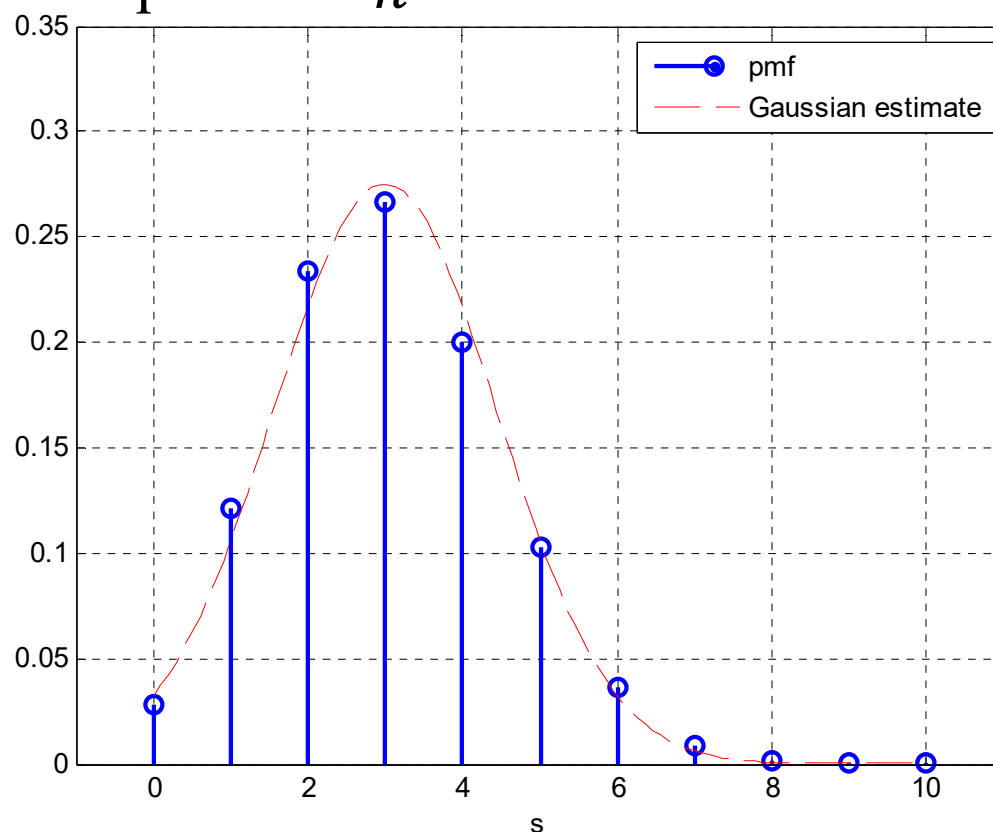
Sum of *five* Bernoulli RVs

- Let
 - X_1, X_2, \dots be i.i.d. Bernoulli(p).
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .
- $n = 5$:



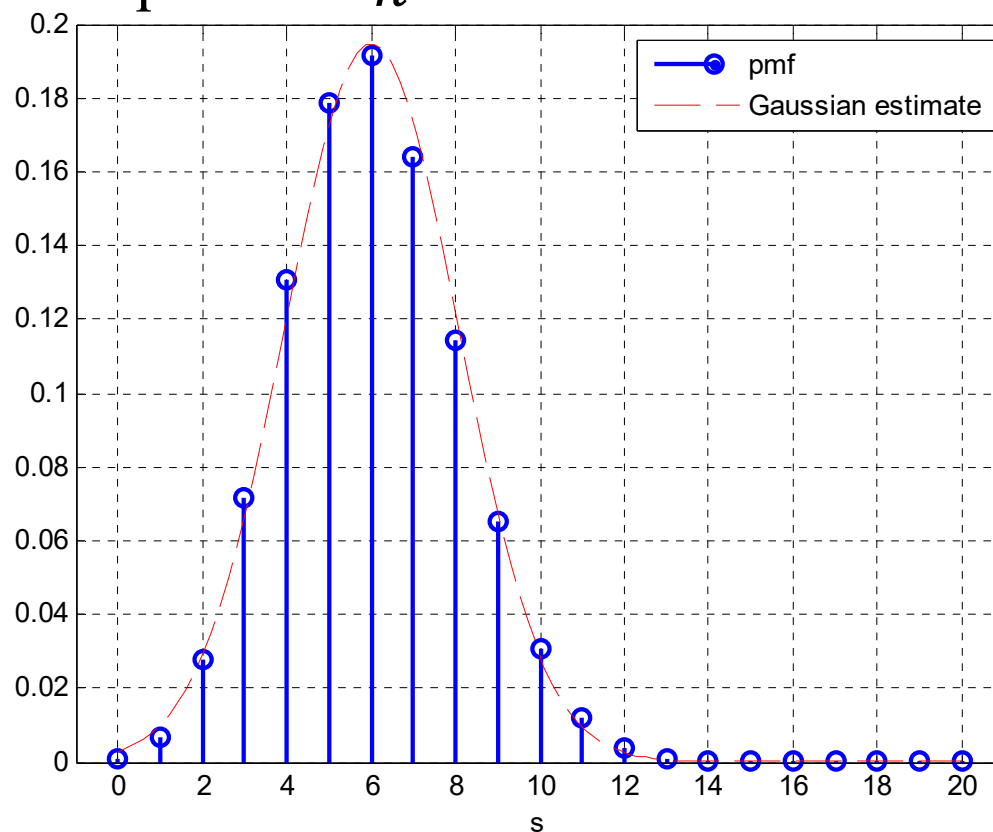
Sum of *ten* Bernoulli RVs

- Let
 - X_1, X_2, \dots be i.i.d. Bernoulli(p).
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .
- $n = 10$:



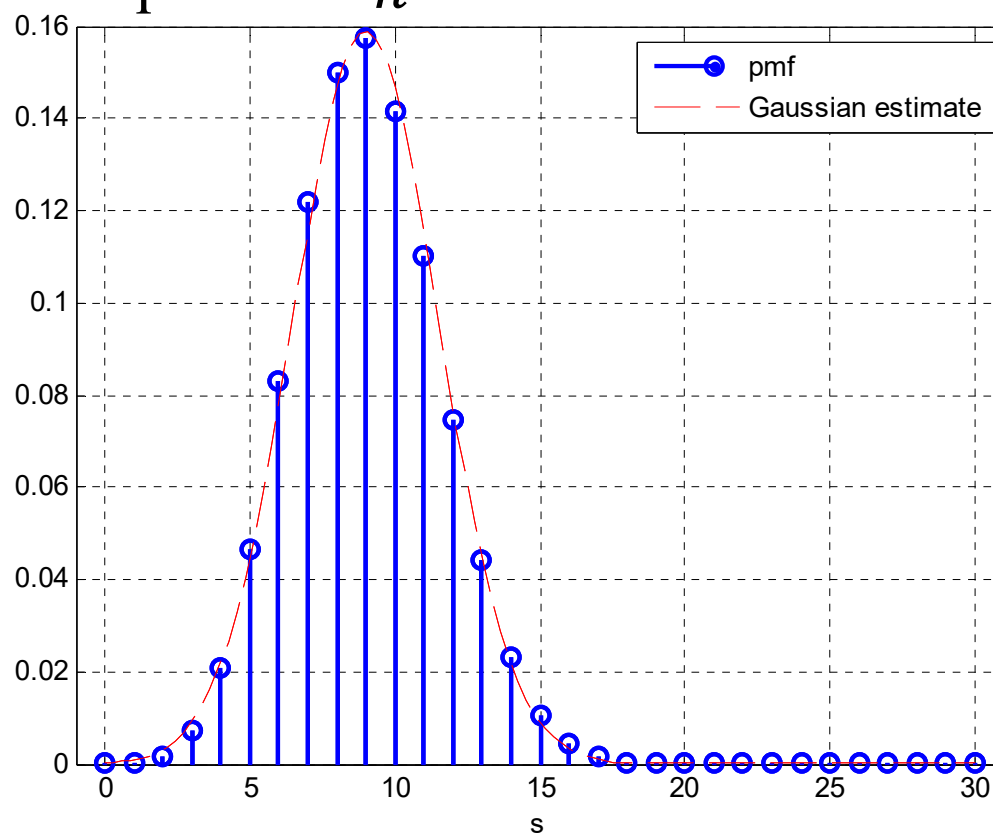
Sum of 20 Bernoulli RVs

- Let
 - X_1, X_2, \dots be i.i.d. Bernoulli(p).
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .
- $n = 20$:



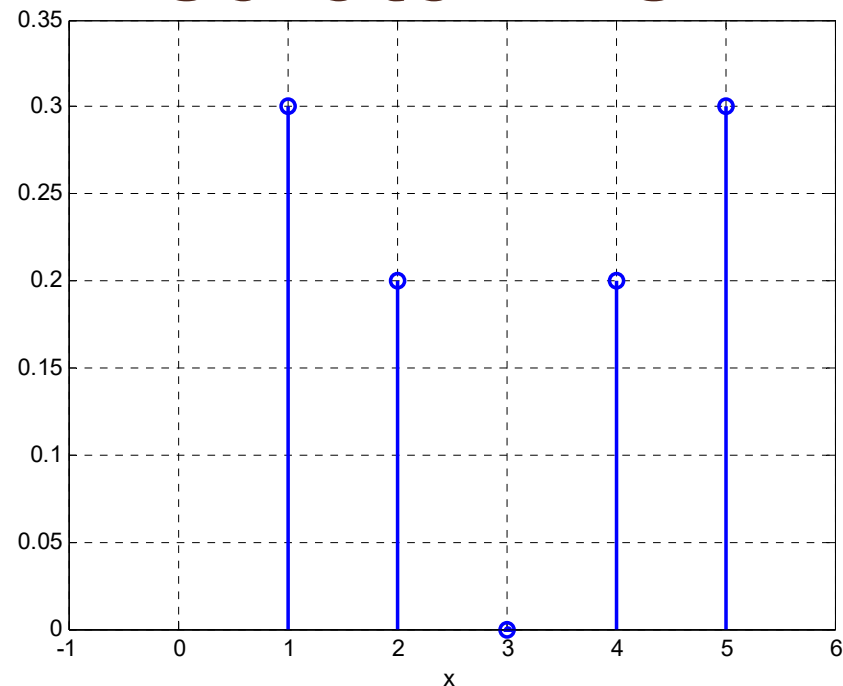
Sum of 30 Bernoulli RVs

- Let
 - X_1, X_2, \dots be i.i.d. Bernoulli(p).
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .
- $n = 30$:



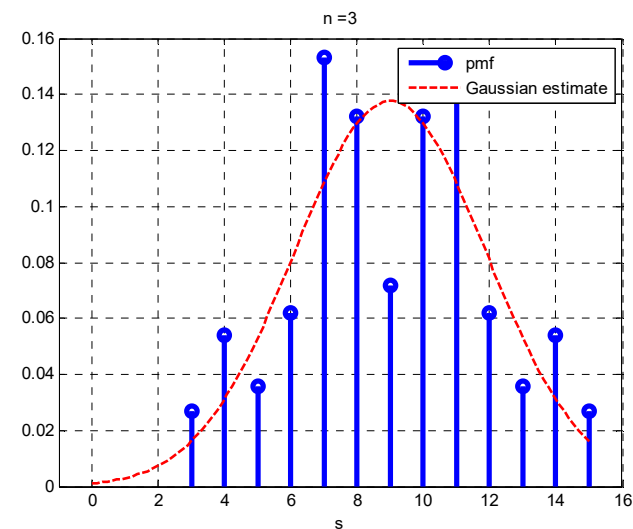
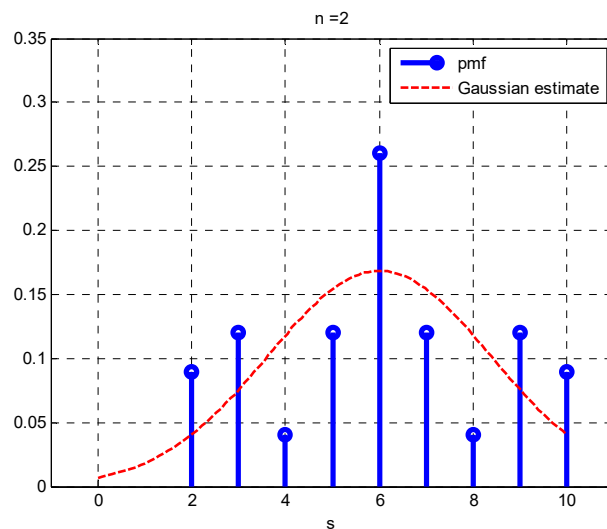
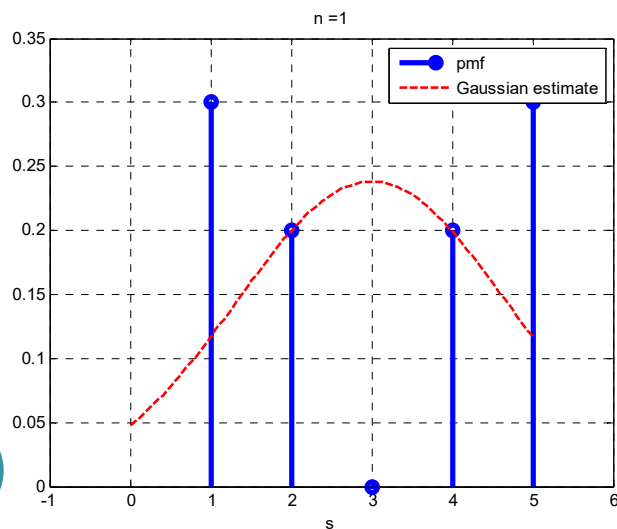
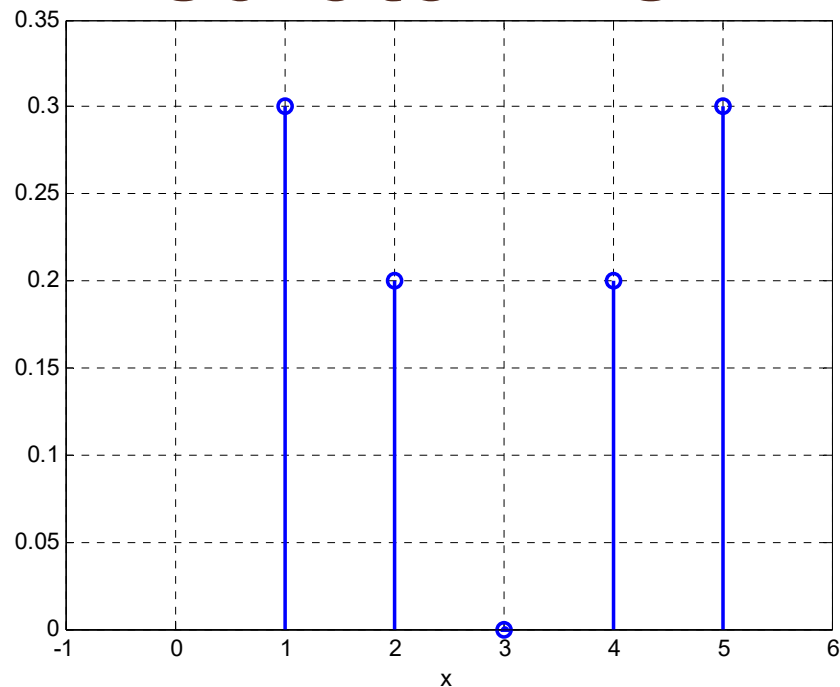
Sum of n “Arbitrary” Discrete RVs

- Let
 - X_1, X_2, \dots be i.i.d.
 - Here is their shared pmf: \longrightarrow
 - $S_n = \sum_{k=1}^n X_k$.
- Let's try to plot the pmf of S_n .



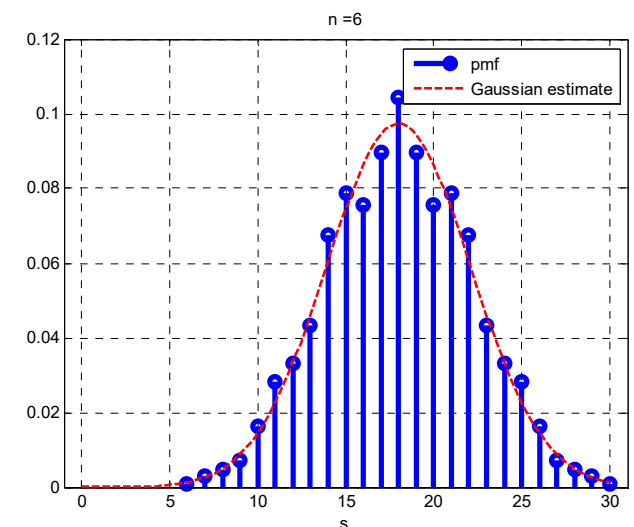
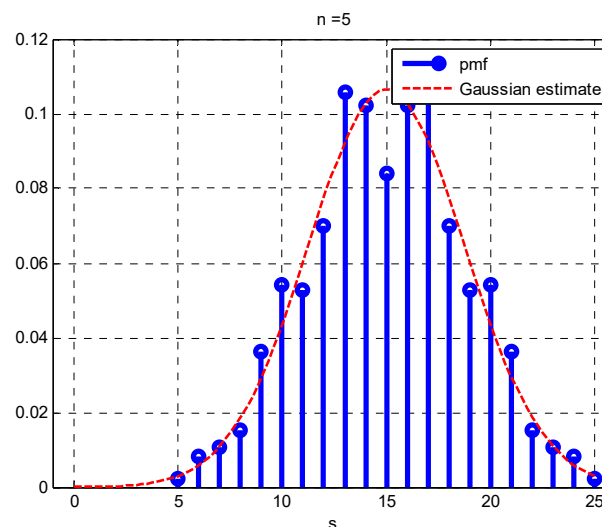
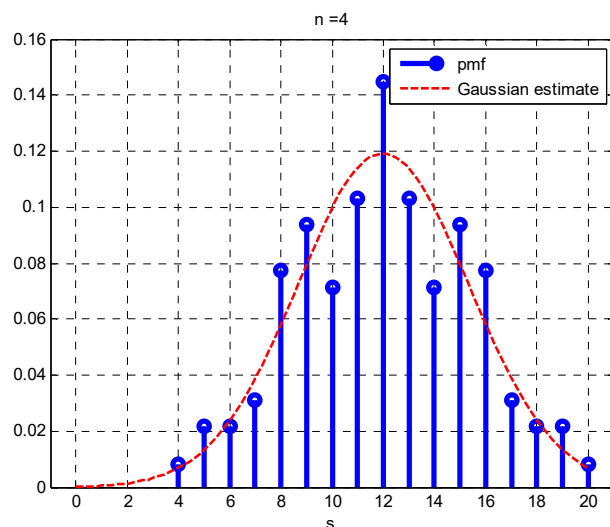
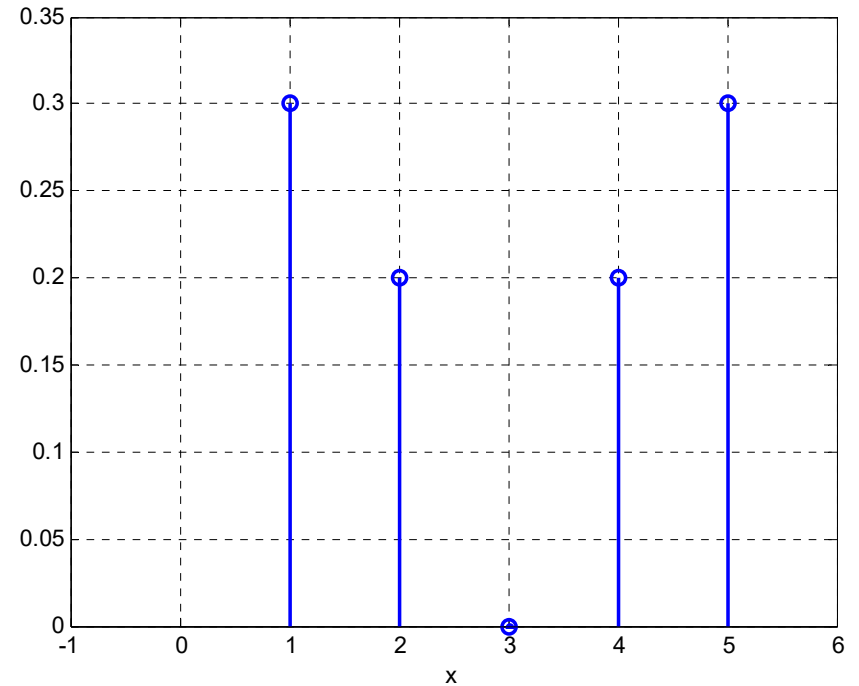
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