Assignment 5: LTI Assignment

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What is the mean associated with the wordle guess distribution?

The guess distribution is as follows:

$$\begin{aligned}
&2 : 17 \text{ times}\\
&3 : 191 \text{ times}\\
&4 : 172 \text{ times}\\
&5 : 58 \text{ times}\\
&6 : 16 \text{ times}
\end{aligned}$$

The mean is calculated as follows:

$$\begin{aligned}
\mu_{\text{guess}} &= \frac{2 \times 17 + 3 \times 191 + 4 \times 172 + 5 \times 58 + 6 \times 16}{17 + 191 + 172 + 58 + 16}\\
&= \frac{34 + 573 + 688 + 290 + 96}{454}\\
&= 3.703
\end{aligned}$$

Therefore, the mean associated with the wordle guess distribution is 3.703.

What is the variance or standard deviation of the guess distribution?

The variance is calculated as follows:

$$\begin{aligned}
\text{Var}(X) &= E[X^2] - E[X]^2\\
&= \frac{2^2 \times 17 + 3^2 \times 191 + 4^2 \times 172 + 5^2 \times 58 + 6^2 \times 16}{454} - 3.703^2\\
&= 0.7508
\end{aligned}$$

Therefore, the variance of the guess distribution is 0.748. The standard deviation is the square root of the variance, which is $\sqrt{0.7508} = 0.866$.

What is the variance of the mean of the distribution? Or similarly, what is the standard error of the mean.

The variance of the mean is calculated as follows:

$$\begin{aligned}
\text{Var}(\bar{X}) &= \frac{\text{Var}(X)}{n}\\
&= \frac{0.7508}{454}\\
&= 0.002
\end{aligned}$$

The standard error of the mean is the square root of the variance of the mean, which is $\sqrt{0.002} = 0.041$.