HOMEWORK 3

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Exercise: 3

Chapter 6.6

N3

2) $6as(6) = E[6] - 0 = E[ax_n] - 0 = 2$ $= 2 E[x_n] - 0 = 2 E[x_1, +... x_n] - 0 = 2$ $= \frac{2}{h} \left(\frac{E[x_1]}{h} + ... + E[x_n] \right) - 0 = \frac{2}{h} \cdot \left(\frac{2}{h} \cdot h \right) = 2$ = 0 - 0 = 0 - un 6iased2) $Var(6) = Var(2 \cdot \left(\frac{x_1 + ... + x_n}{h} \right) = \frac{4}{h^2} \cdot \left(\frac{6}{12} \cdot h \right) = 2$ $= \frac{6}{3h}$ 3) $MSE = Var(6) + 6ias^2(6) = Var(6) + 0 = 2$ $= \frac{6}{3h}$

Exercise: 2

Ex 2.
Let X1 Xn ~ Berroulli (p)
Y, in Ym ~ Bernoulli(g)
P= T(B)= = = X = X, = X,
Se (B) = Vaz (B) = V 02 = V 10 (1-p) = = = = = = = = = = = = = = = = = = =
$o = \sqrt{p(1-p)}$ $\int_{h}^{\infty} \frac{p(1-p)}{h}$
Confidence interval:
B = 1,86j · Se (B)
p= Xn - Ym
Se (B) = War (B) = = Var (Xn) + Var (Ym) -
= [Xn (1-Xn) + Ym (1- Xn)'
그 그는 그리다 내용 전에 내용하는 하는데 하는데 보다 하는데 되는데 하는데 하는데 하는데 하는데 하는데 하는데 하는데 하는데 하는데 하
Confidence interval;
P = 1,64. Se (P)

Exercise: 9

```
\mathcal{E}_{2} \mathcal{G}
\mathcal{P}_{1} = 0.9
\mathcal{P}_{2} = 0.85
\mathcal{E}_{2} = \hat{p}_{1} - \hat{p}_{2} = 0.9 - 0.85 = 0.05
Se(\mathcal{B}) = \sqrt{\frac{P_{1}(1 - P_{1})}{h}} + \frac{P_{2}(1 - P_{2}^{2})}{h}^{2} \sqrt{\frac{0.9(0.1)}{100}} + \frac{0.85/0.85}{100}
= 0.047
0.05 \pm 0.0596 - \text{for } 80\%
0.05 \pm 0.091 - \text{for } 90\%
\hat{\sigma} \pm 2 (80\%) \cdot Se(\hat{\sigma})
```

Exercise: 6

```
mu <- 5
n <- 100
X <- rnorm(n, mean = mu, sd = 1)
theta_func <- function(x) exp(mean(x))
B <- 10000
theta_boot <- replicate(B, theta_func(sample(X, replace = TRUE)))
hist(theta_boot, main = "Histogram of Bootstrap Replications", xlab = "theta")
curve(dexp(x, rate = 1), from = 0, to = 50, add = TRUE, col = "blue")</pre>
```

Histogram of Bootstrap Replications

