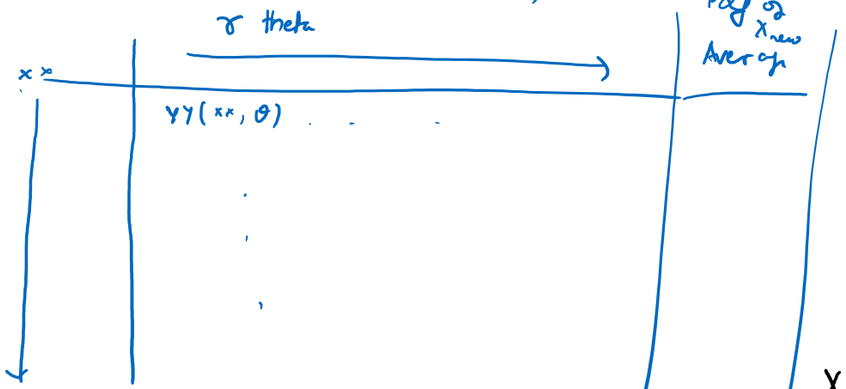
Distribution of X_{new}

- draw $\gamma\theta$ from $\pi(\theta \mid \underset{\sim}{x})$
- $xx = seq(3, 7, length = 100)$
- $yy = dnorm(xx, mean = \xi, sd = \frac{1}{\sqrt{\tau\theta}})$

$$P(X_{new} > 4.8) = E\Big(P(X_{new} > 4.8 \mid \theta)\Big)$$

(over θ)



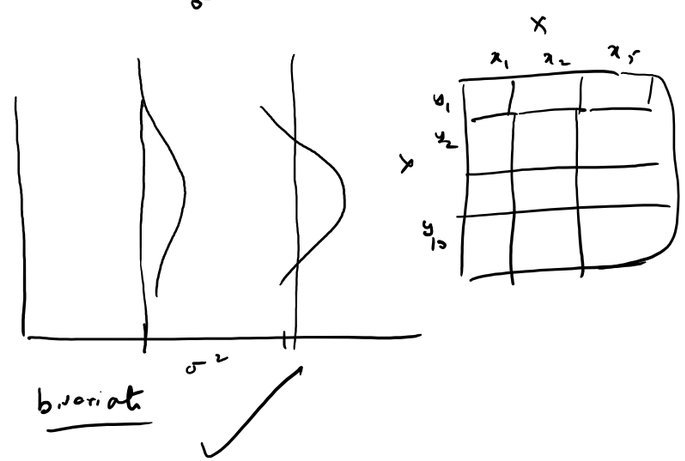
"Knowing the distribution of X_{new} means we should be able to simulate observations as per the distribution of X_{new}"

$$X_{new} \mid \sigma^2 \sim N(5, \sigma^2)$$

$$\frac{1}{\sigma^2} \sim \text{Gamma}(\gamma_1, \lambda_1)$$

To Simulate X_{new}

1. Simulate $\frac{1}{\sigma^2}$ from Gamma (γ_1, λ_1)
2. Given $\frac{1}{\sigma^2}$ from (1) simulate X_{new} from $N(5, \sigma^2)$
3. Repeat 1 & 2 large number of times X_{new}

IMPORTANT

Knowing Joint distribution of 2 r.vs (X, Y) means I know distribution of Y & I " " " $X \mid_{Y=y}$