Previously on MA40189:

- $\theta \sim N(\mu_0, \sigma_0^2)$ and $X \mid \theta \sim N(\theta, \sigma^2)$ where σ^2 is known

$$f(\theta) \ \propto \ \exp\left\{-\frac{1}{2\sigma_0^2}\left(\theta^2 - 2\mu_0\theta\right)\right\}$$

  – this is a kernel of the normal distribution

$$f(x \mid \theta) \ \propto \ \exp\left\{-\frac{1}{2\sigma^2}\left(\theta^2 - 2x\theta\right)\right\}$$

  – (as a function of θ) looks like a kernel of $N(x, \sigma^2)$

Today on MA40189:

- given a normal likelihood (with known variance), the normal distribution is a conjugate family
- using the posterior for inference: region that captures most of the values of θ (assumed univariate)
- credible interval (θ_L, θ_U) is an interval within which $100(1-\alpha)\%$ of the posterior distribution lies

$$P(\theta_L < \theta < \theta_U \mid x) \ = \ 1 - \alpha$$

- difference in interpretation with a $100(1-\alpha)\%$ confidence interval $(\theta_L^*(x), \theta_U^*(x))$ for θ
- illustration using the to tossing coins and drawing pins example