HW5

Due Tuesday, November 6, 2018
(by 23:59, via Sakai)

Name _____ **Grade** _____

Problem 1: Tumor count comparisons:

Studying: The files school1.dat, school2.dat and school3.dat contain data on the amount of time students from three high schools spent on studying or homework during an exam period. Analyze data from each of these schools separately, using the normal model with a conjugate prior distribution, in which $\{\mu_0 = 5, \sigma_0^2 = 4, \kappa_0 = 1, \nu_0 = 2\}$ and compute or approximate the following:

(a) posterior means and 95% confidence intervals for the θ and standard deviation σ from each school;

(b) Compute the posterior probability that θ_1 is bigger than both θ_2 and θ_3, and the posterior probability that $\tilde{Y}_1$ is bigger than both $\tilde{Y}_2$ and $\tilde{Y}_3$.

Problem 2: Only required for stat students

(a) Show that Jeffreys' prior for the normal model is $P(\theta, \sigma^2) \propto (\sigma^2)^{-3/2}$. Hint: Consider σ^2 as one parameter.

(b) Apply this prior to the Midge wing example (note 5), using WinBUGS or JAGS. Hint: assume a flat prior for θ, for σ^2 approximate $(\sigma^2)^{-3/2}$ by Inv-Gamma prior.