HW07

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9/29/2016

Problem 2

Part D

```
data(Prostate)
lm.lpsa = lm(lpsa~lcavol,data=Prostate)

cred.int = function(lm.object,alpha,lambda,b.0,nu.0,ss.0,g){
  X = model.matrix(lm.object)
  beta.hat = as.matrix(coef(lm.object))
  ## SSE
  SSE = t(lm.object$residuals) %*% lm.object$residuals

  XtX = t(X) %*% X
  XtX.inv = solve(XtX)


  big.phi.0 = (1/g)*XtX
  big.phi.n = (g/(1+g)) * XtX
  big.phi.n.inv = solve(big.phi.n)

  b.n = (g/(1+g))*(beta.hat) + (1/(1+g))*b.0
  nu.n = nu.0 + nrow(X)

  ss.n = SSE + ss.0 + t(beta.hat) %*% XtX %*% beta.hat +
    t(b.0) %*% big.phi.0 %*% b.0 - t(b.n) %*% big.phi.n %*% b.n

  sigma2.hat = ss.n / nu.n
  sigma.hat = sqrt(sigma2.hat)

  SE = sigma.hat * sqrt(t(lambda) %*% big.phi.n.inv %*% lambda)

  quant = t(lambda) %*% b.n + SE*qt(c(alpha/1,1-alpha/2), df = nu.n)
  return(quant)
}
```