MAI0142
Hand in Problems – 5

1. Let $\boldsymbol{X} = \boldsymbol{ABC} + \boldsymbol{\Sigma}^{1/2}\boldsymbol{EW}^{1/2}$, where $\boldsymbol{X}, \boldsymbol{A}, \boldsymbol{B}, \boldsymbol{C}$ and $\boldsymbol{\Sigma}$ are as in the Growth curve model, $\boldsymbol{W}$ is known and positive definite and $\boldsymbol{E} \sim N(\boldsymbol{0}, \boldsymbol{I}_p, \boldsymbol{I}_n)$. Find the maximum likelihood estimators of the parameters.

2. Consider the Growth Curve model, $\boldsymbol{X} \sim N_{p,n}(\boldsymbol{ABC}, \boldsymbol{\Sigma}, \boldsymbol{I}_n)$. Use simulations to indicate that the MLE $\widehat{\boldsymbol{B}}$ is unbiased. For a given data set also estimate $D(\widehat{\boldsymbol{B}})$. Moreover, show via simulations that $\widehat{\boldsymbol{B}}$ is not normally distributed.