STA 312F07 Quiz 4

Consider the following multivariate regression model with no measurement error. This is the model for one observation. Implicitly, it holds for $i = 1, \ldots, n$, but the subscript i on all the random variables is invisible.

$$\mathbf{Y} = \boldsymbol{\Gamma}\mathbf{X} + \boldsymbol{\zeta}$$

where

$\mathbf{Y}$ is an $m \times 1$ random vector of observable dependent variables, so the regression can be multivariate; there are m dependent variables.

$\mathbf{X}$ is a $p \times 1$ observable random vector; there are p independent variables. $\mathbf{X}$ is multivariate normal with expected value zero and variance-covariance matrix $\boldsymbol{\Phi}$, a $p \times p$ symmetric and positive definite matrix of unknown constants.

$\boldsymbol{\Gamma}$ is an $m \times p$ matrix of unknown constants. These are the regression coefficients, with one row for each dependent variable and one column for each independent variable.

$\boldsymbol{\zeta}$ is the error term of the latent regression. It is an $m \times 1$ multivariate normal random vector with expected value zero and variance-covariance matrix $\boldsymbol{\Psi}$, an $m \times m$ symmetric and positive definite matrix of unknown constants. $\boldsymbol{\zeta}$ and $\mathbf{X}$ are independent.

Is this model identified? Answer Yes or No and show your work.

Total Marks = 10 Points