1 Introduction to GLLAMM

GLLAMM is Stata software for performing latent variable analysis. It can be used for the structural modeling of measurement error models.

Because the software is a structural model, it has the three main components of all structural models, namely the risk model, the latent variable or exposure model, and the measurement error model.

Hence in logistic regression, we might have

\[ \operatorname{pr}(Y = 1|Z, X) = H(\beta_0 + Z^T \beta_z + X \beta_x). \]

GLLAMM calls this the outcome model.

In our example, we are interested in the case that \( X \) is the true transformed systolic blood pressure at exam 2. We observe \( W_1 \). We also observe a replicate of \( W \) at exam 3, namely \( W_2 \). In this model, which GLLAMM calls the measurement model,

\[
W_{ij} = X_i + U_{ij}; \\
U_{ij} = \text{Normal}(0, \sigma_u^2).
\]

Finally, we have a model for \( X \), GLLAMM calls this the true covariate model:

\[
X_i = \text{Normal}(\alpha_0 + Z_i^T \alpha_z, \sigma_x^2).
\]

GLAMM can also be used when the measurement error variance is known or estimates externally.