Exercises Session 3: Longitudinal SEMs

Additional exercise 2

(Similar to exercise 5.1 from the book.)

Here are the means and covariance matrix of six measurements in a sample called 'group 0' (sample size = 30):

```
gr0.cov <- lav_matrix_lower2full(c(
  3.59,
  3.11, 3.10,
  2.91, 2.80, 2.82,
  3.22, 3.05, 2.86, 3.30,
  2.88, 2.63, 2.62, 2.82, 2.71
))
gr0.means <- c(11.97, 11.72, 12.03, 11.96, 12.10)

colnames(gr0.cov) <- rownames(gr0.cov) <-
  c("T1", "T2", "T3", "T4", "T5")
```

a) Fit the consecutive latent growth curve models 1 to 4 (see Example 5.2) to the data. Find the best-fitting model.

b) What do the means and variances of the latent intercept and slope, and the standardized factor loadings tell you about inter- and intra-individual differences?

Additional exercise 3

Demo.growth is a dataset that is included in the lavaan package, consisting of 400 observations on the following variables:

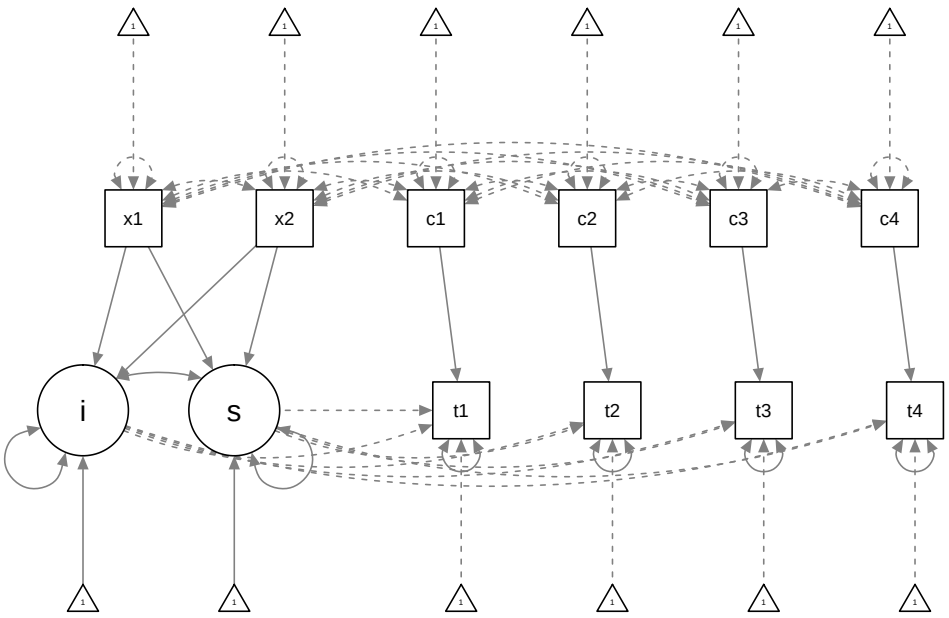
$t1$ - $t4$: variable of interest, measured at four timepoints

$x1$ - $x2$: two time-invariant covariates

$c1$ - $c4$: a time-varying covariate

```
data(Demo.growth)
```

Fit an LGCM with $x1$ and $x2$ as time-constant predictors of the latent intercept and slope, and $c1$ trough $c4$ as time-varying predictors of the observed variables $t1$ through $t4$. Like in the following picture:



a) Test whether x1 and x2 are significant predictors of the slope and/or intercept.
b) Test whether c has the same effect on t at each timepoint.
c) Test whether the residual variances are the same at across timepoints.