This report is about space-time analysis. You will fit two covariance models below (with same mean structure) and compare the fit in terms of likelihood, and prediction (both in space and time).

- Use maximum likelihood estimation for estimating mean and covariance parameters.
- Compare $\alpha$, $\beta_i$, and mean parameter estimates and their asymptotic standard errors from the two model fits.
- Perform cross validation spatially and temporally and compare prediction performance of the two models.

**Cov model 1:**

$$\text{Cov}\{Z(s_1, t_1), Z(s_2, t_2)\} = \frac{\alpha}{2^{\nu} \Gamma(\nu)} D^\nu K_\nu(D)$$

with

$$D = \sqrt{|s_1 - s_2|^2 / \beta_1 + |t_1 - t_2|^2 / \beta_2}$$

**Cov model 2:**

$$\text{Cov}\{Z(s_1, t_1), Z(s_2, t_2)\} = \frac{\alpha}{2^{\nu_1 + \nu_2} \Gamma(\nu_1) \Gamma(\nu_2)} \left( |s_1 - s_2| / \beta_1 \right)^{\nu_1} K_{\nu_1} \left( |s_1 - s_2| / \beta_1 \right) \times \left( |t_1 - t_2| / \beta_2 \right)^{\nu_2} K_{\nu_2} \left( |t_1 - t_2| / \beta_2 \right)$$