University of California, Los Angeles
Department of Statistics

Statistics C173/C273 **Instructor: Nicolas Christou**

More variograms

Two more varograms are presented below:

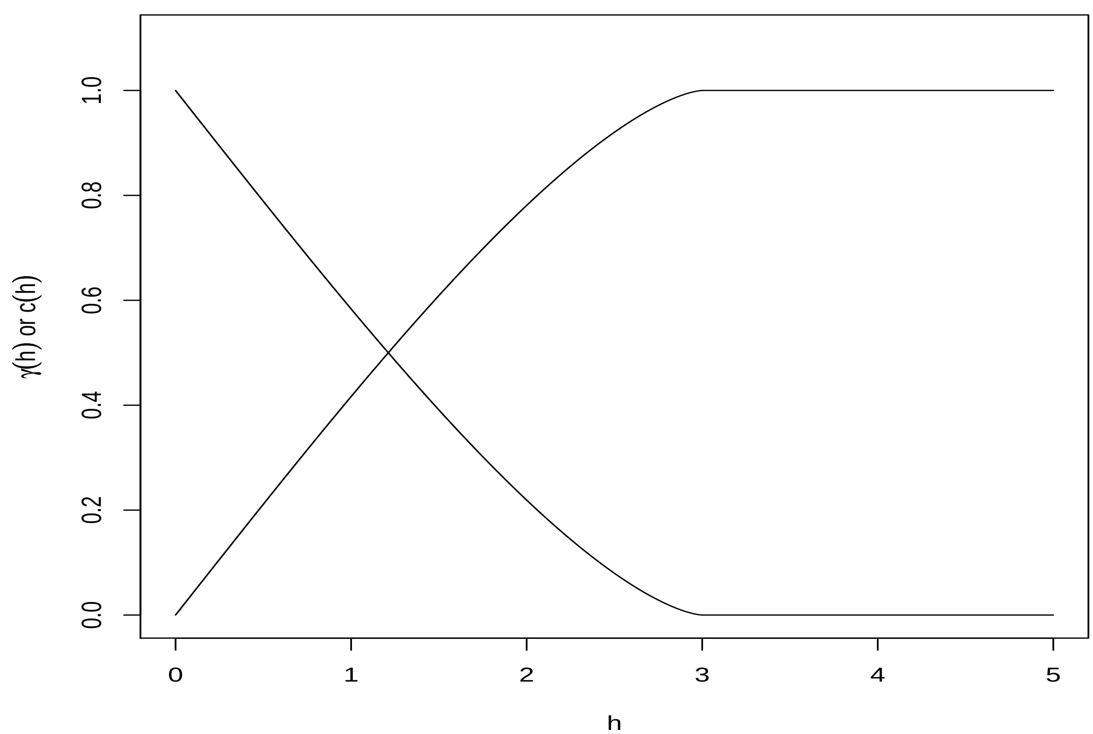
a. Circular semi-variogram:

$$\gamma(h;\boldsymbol{\theta}) = \begin{cases} c_1\left(1 - \frac{2}{\pi}cos^{-1}(\frac{h}{\alpha}) + \frac{2h}{\pi\alpha}\sqrt{1-\frac{h^2}{\alpha^2}}\right), & h \le \alpha \\ c_1, & h > \alpha \end{cases}$$

For second-order stationary process the covariogram is computed through $\gamma(h) = C(0) - C(h)$:

$$c(h;\boldsymbol{\theta}) = \begin{cases} -c_1\left(-\frac{2}{\pi}cos^{-1}(\frac{h}{\alpha}) + \frac{2h}{\pi\alpha}\sqrt{1-\frac{h^2}{\alpha^2}}\right), & h \le \alpha \\ 0, & h > \alpha \end{cases}$$

Suppose: $c_0 = 0, c_1 = 1, \alpha = 3$.



b. Cubic variogram:

$$\gamma(h;\boldsymbol{\theta}) = \begin{cases} c_1\left(7(\frac{h}{\alpha})^2 - 8.75(\frac{h}{\alpha})^3 + 3.5(\frac{h}{\alpha})^5 - 0.75(\frac{h}{\alpha})^7\right), & h \le \alpha \\ c_1, & h > \alpha \end{cases}$$

For second-order stationary process the covariogram is computed through $\gamma(h) = C(0) - C(h)$:

$$c(h;\boldsymbol{\theta}) = \begin{cases} c_1 - c_1\left(7(\frac{h}{\alpha})^2 - 8.75(\frac{h}{\alpha})^3 + 3.5(\frac{h}{\alpha})^5 - 0.75(\frac{h}{\alpha})^7\right), & h \le \alpha \\ 0, & h > \alpha \end{cases}$$

Suppose: $c_0 = 0, c_1 = 1, \alpha = 3$.