Systems 502 Tony E. Smith

KRIGING MODELS

Given spatial observations $\left(y(s): s \in S = \{s_1,..,s_N\}\right)$, consider the *general probability model*:

(1) $$Y(s) = \mu(s) + \varepsilon(s) \;\;,\;\; s \in S$$

where by definition $E\left[\varepsilon(s)\right] = 0$, $s \in S$. In this setting there are four different sets of modeling assumptions that are used:

Simple Kriging Model.

(1) $$\mu(s) = \mu \text{ known} \;,\; s \in S$$

(2) $$\text{cov}\left[\varepsilon(s), \varepsilon(s')\right] \text{ known},\;\; s, s' \in S\,(3)$$

Ordinary Kriging Model.

(3) $$\mu(s) = \mu \text{ unknown} \;,\; s \in S$$

(4) $$\text{cov}\left[\varepsilon(s), \varepsilon(s')\right] \text{ known},\;\; s, s' \in S$$

Universal Kriging Model.

(5) $$\mu(s) = x(s)'\beta \;,\; s \in S \;,\; \beta \text{ unknown}$$

(6) $$\text{cov}\left[\varepsilon(s), \varepsilon(s')\right] \text{ known},\;\; s, s' \in S$$

Geostatistical Regression Model.

(7) $$\mu(s) = x(s)'\beta \;,\; s \in S \;,\; \beta \text{ unknown}$$

(8) $$\text{cov}\left[\varepsilon(s), \varepsilon(s')\right] = C\left(\|s - s'\|; \theta\right),\;\; s, s' \in S \,,\; \theta \text{ unknown}$$