CAR

"Conditional Gaussian Autoregressive"

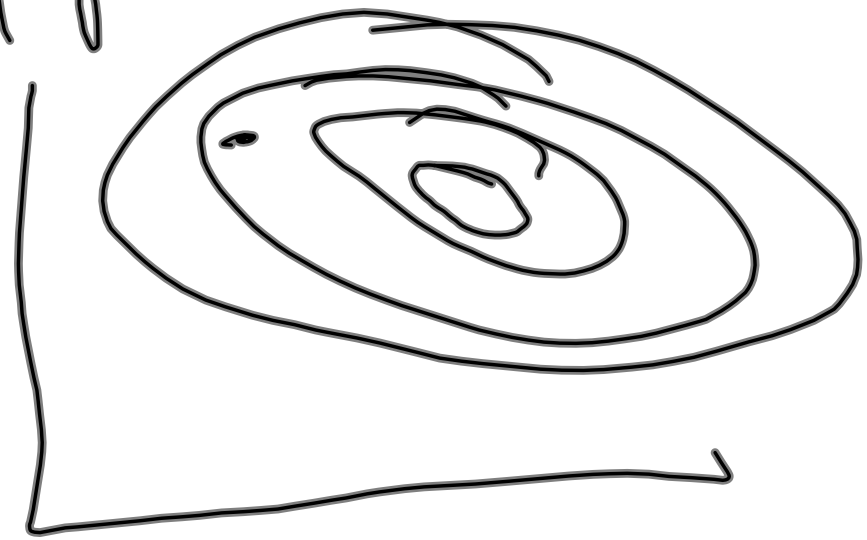
conditioning

$$x_{i,t+1} \sim N(\bar{x}_{neigh,t}, \sigma)$$

Probability theory

joint probability

a



b

$p(a,b)$

Probability theory

conditional probability ← $p(a \mid b = \hat{b})$

$p(a, b)$

$p(a \mid \hat{b})$

frozen

Probability theory

$p(a,b)$

$p(a)\int db$

"Kriging" Family:

descriptive

interpolate

$$\underset{\sim}{x} \sim N(\underline{\mu}, C)$$

multivariate normal

Example for "pattern" in C

$$C_{ij} = \sigma^2 e^{-\alpha d_{ij}}$$

n observations $\underline{y}$

m interpolate $\underline{x}$

$$\underline{x} \mid \underline{y} \sim N\left(\underline{\mu}_{x|y},\ C_{x|y\, x|y}\right)$$

Matrix multiplication

$$\underset{n\times m}{A}\ \underset{m\times k}{B} = C_{n\times k}$$

$$c_{ij} = \underline{a}_i \cdot \underline{b}_j$$

$$\underline{a} \cdot \underline{b} = \sum a_i b_i$$

$$\underset{m}{\underline{\mu}_{x|y}} = \underset{m}{\underline{\mu}} + \underbrace{\underset{m\times n}{C_{x|y}}\,\underbrace{\underset{n\times n}{C_{yy}^{-1}}\,\underset{n}{(\underline{y}-\underline{\mu})}}_{n}}_{m}$$

$$C_{x/y\,x/y} = \underbrace{\underbrace{\underset{m\times n}{C_{x/y}}\;\underset{n\times n}{C_{yy}^{-1}}}_{m\times n}\;\underset{n\times m}{C_{y|x}}}_{m\times m}$$