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

Inverse of a partitioned matrix

If all inverses exist,

$$\begin{pmatrix} \mathbf{A_{11}} & \mathbf{A_{12}} \\ \mathbf{A_{21}} & \mathbf{A_{22}} \end{pmatrix} = \begin{pmatrix} \mathbf{A_{11}^{-1}} + \mathbf{B_{12}}\mathbf{B_{22}^{-1}}\mathbf{B_{21}} & -\mathbf{B_{12}}\mathbf{B_{22}^{-1}} \\ -\mathbf{B_{22}^{-1}}\mathbf{B_{12}} & \mathbf{B_{22}^{-1}} \end{pmatrix} = \begin{pmatrix} \mathbf{C_{11}^{-1}} & -\mathbf{C_{11}^{-1}}\mathbf{C_{12}} \\ -\mathbf{C_{21}}\mathbf{C_{11}^{-1}} & \mathbf{A_{22}^{-1}} + \mathbf{C_{21}}\mathbf{C_{11}^{-1}}\mathbf{C_{12}} \end{pmatrix}$$

where
$\mathbf{B_{22}} = \mathbf{A_{22}} - \mathbf{A_{21}}\mathbf{A_{11}^{-1}}\mathbf{A_{12}}$
$\mathbf{B_{12}} = \mathbf{A_{11}^{-1}}\mathbf{A_{12}}$
$\mathbf{B_{21}} = \mathbf{A_{21}}\mathbf{A_{11}^{-1}}$

and
$\mathbf{C_{11}} = \mathbf{A_{11}} - \mathbf{A_{12}}\mathbf{A_{22}^{-1}}\mathbf{A_{21}}$
$\mathbf{C_{12}} = \mathbf{A_{12}}\mathbf{A_{22}^{-1}}$
$\mathbf{C_{21}} = \mathbf{A_{22}^{-1}}\mathbf{A_{21}}$

Use these results to show that kriging is an exact interpolator.