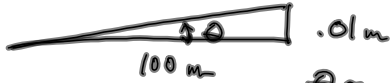


Lecture 17

$$\theta \sim .0001 \text{ R}, \sim .0057$$

Now w/ dist. units km 17-1

$$\sigma_{\text{dist}} = .01 \text{ m}$$

$$\sigma_{\text{ang}} = .0001 \text{ R}$$

$$\text{choose } \sigma_0^2 = (.01)^2$$

$$W_d = \frac{(.01)^2}{(.01)^2} = 1$$

$$W_a = \frac{(.01)^2}{(.0001)^2} = 10,000$$

$$\sigma_d = .00001 \text{ km}$$

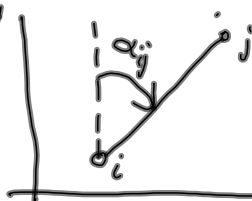
$$\sigma_a = .0001 \text{ R}$$

$$\sigma_0^2 = (.0001)^2$$

$$W_d = \frac{(.0001)^2}{(.00001)^2} = 100$$

$$W_a = \frac{(.0001)^2}{(.0001)^2} = 1$$

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Ch. 10 AASM

17-2

$$\alpha_{ij} = \text{atan} \frac{x_j - x_i}{y_j - y_i} = \text{atan} \frac{\Delta x}{\Delta y} \quad \begin{matrix} \Delta x = x_j - x_i \\ \Delta y = y_j - y_i \end{matrix}$$

$$\frac{\partial}{\partial x_i} \tan^{-1} \left(\frac{\Delta x}{\Delta y} \right) = \frac{1}{1 + \left(\frac{\Delta x}{\Delta y} \right)^2} \cdot \frac{1}{\Delta y} (-1) \cdot \frac{\Delta y}{\Delta y} = \frac{-\Delta y}{\Delta x^2 + \Delta y^2} = \frac{-\Delta y}{D_{ij}^2}$$

$$\frac{\partial}{\partial x_j} \tan^{-1} \left(\frac{\Delta x}{\Delta y} \right) = \quad (+) \quad = \frac{\Delta y}{\Delta x^2 + \Delta y^2} = \frac{\Delta y}{D_{ij}^2}$$

$$\frac{\partial}{\partial y_i} \tan^{-1} \left(\frac{\Delta x}{\Delta y} \right) = \frac{1}{1 + \left(\frac{\Delta x}{\Delta y} \right)^2} \cdot -\frac{\Delta x}{\Delta y^2} (-1) = \frac{\Delta x}{\Delta x^2 + \Delta y^2} = \frac{\Delta x}{D_{ij}^2}$$

$$\frac{\partial}{\partial y_j} \tan^{-1} \left(\frac{\Delta x}{\Delta y} \right) = \quad (+) \quad = \frac{-\Delta x}{D_{ij}^2}$$

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$$\alpha_{ij} = \tan^{-1} \left(\frac{\Delta x}{\Delta y} \right) \quad 17-3$$

$$F_{\alpha} = \alpha_{ij} - \tan^{-1} \left(\frac{\Delta x}{\Delta y} \right) = 0$$

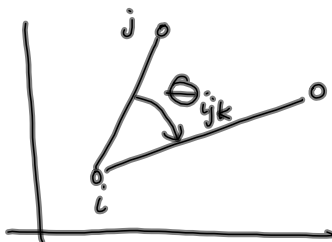
$$\frac{\partial F_{\alpha}}{\partial x_i} = \frac{\Delta y}{D_{ij}^2} \quad f = -F_{\alpha}$$

$$\frac{\partial F_{\alpha}}{\partial x_j} = -\frac{\Delta y}{D_{ij}^2}$$

$$\frac{\partial F_{\alpha}}{\partial y_i} = -\frac{\Delta x}{D_{ij}^2}$$

$$\frac{\partial F_{\alpha}}{\partial y_j} = \frac{\Delta x}{D_{ij}^2}$$

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angle obs. Θ
+ CW direction
from j to k

17-4

$$\Theta_{ijk} = \alpha_{ik} - \alpha_{ij}$$

$$\Theta_{ijk} = \text{atan} \frac{\Delta x_{ik}}{\Delta y_{ik}} - \text{atan} \frac{\Delta x_{ij}}{\Delta y_{ij}}$$

$$F_{\Theta_{ijk}} = \Theta_{ijk} - \text{atan} \left[\frac{\Delta x_{ik}}{\Delta y_{ik}} \right] + \text{atan} \left[\frac{\Delta x_{ij}}{\Delta y_{ij}} \right] = 0$$

$$\frac{\partial F_{\Theta}}{\partial x_i} = \frac{\Delta y_{ik}}{D_{ik}^2} - \frac{\Delta y_{ij}}{D_{ij}^2}$$

$$\frac{\partial F_{\Theta}}{\partial x_j} = \frac{\Delta y}{D_{ij}^2} \quad \text{this was wrong in lecture}$$

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