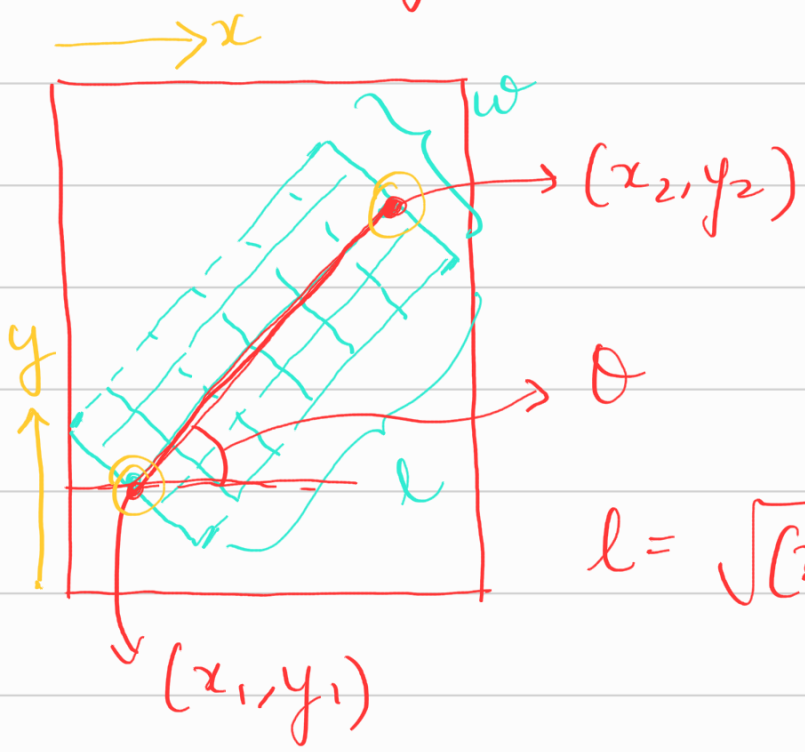
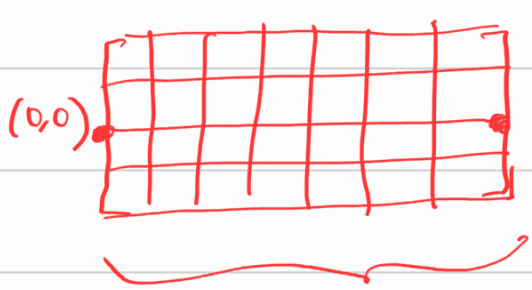
Extracting transects from a grid



$$\theta = \tan^{-1}\left(\frac{y_2 - y_1}{x_2 - x_1}\right)$$

$$l = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

First construct a grid aligned with (x, y)



$$x_g = \text{linspace}(0, l, l/\Delta x)$$
$$y_g = \text{linspace}\left(\frac{-w}{2}, \frac{w}{2}, w/\Delta x\right)$$

} grid this (X_g, Y_g)

Using this grid $[X_g, Y_g]$ → we transport it to (x_1, y_1) and rotate by θ to get the transect grid.

$$x_g' = (X_g + x_1)\cos\theta - (Y_g + y_1)\sin\theta$$

$$x_g' = (x_g + x_1)\cos\theta - (y_g + y_1)\sin\theta$$

$$y_g' = (x_g + x_1)\sin\theta + (y_g + y_1)\cos\theta$$