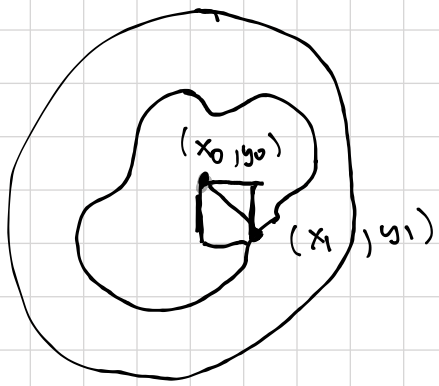
gradient decent in 2-D



$$\vec{x}_{n+1} = \vec{x}_n - \eta \nabla F$$

$$x_{n+1} = x_n - \eta \frac{\partial F}{\partial x}$$

$$y_{n+1} = y_n - \eta \frac{\partial F}{\partial y}$$

$$\frac{\partial F}{\partial x} = \frac{F(x_n, y_{n-1}) - F(x_{n-1}, y_{n-1})}{x_n - x_{n-1}}$$

$$\frac{\partial F}{\partial y} = \frac{F(x_{n-1}, y_n) - F(x_{n-1}, y_{n-1})}{y_n - y_{n-1}}$$

$$\therefore x_2 = x_1 - \eta \left[\frac{F(x_1, y_0) - F(x_0, y_0)}{x_1 - x_0} \right]$$

$$y_2 = y_1 - \eta \left[\frac{F(x_0, y_1) - F(x_0, y_0)}{y_1 - y_0} \right]$$