Tema 3: Descenso por gradiente

Aplicar la técnica de descenso por gradiente a la búsqueda del mínimo de la función $q(\boldsymbol{\theta}) = (\theta_1 - 1)^2 + (\theta_2 - 2)^2 + \theta_1\,\theta_2$ teniendo en cuenta $\rho = \frac{1}{2k}$ y $\boldsymbol{\theta}(1) = (-1, +1)$ y hacer una traza de las 3 primeras iteraciones:

1. $\boldsymbol{\theta}(1) = (-1, +1)$

2. $\frac{\partial q}{\partial \theta_1} = 2\,(\theta_1 - 1) + \theta_2 \xrightarrow{\boldsymbol{\theta}(1)} 2(-2) + 1 = -3$

   $\frac{\partial q}{\partial \theta_2} = 2\,(\theta_2 - 2) + \theta_1 \xrightarrow{\boldsymbol{\theta}(1)} 2(-1) - 1 = -3$

   $\boldsymbol{\theta}(2) = (-1, 1) - \frac{1}{4}\,(-3, -3) = (-\frac{1}{4}, \frac{7}{4})$

3. $\frac{\partial q}{\partial \theta_1} = 2\,(\theta_1 - 1) + \theta_2 \xrightarrow{\boldsymbol{\theta}(2)} 2(-\frac{5}{4}) + \frac{7}{4} = -\frac{3}{4}$

   $\frac{\partial q}{\partial \theta_2} = 2\,(\theta_2 - 2) + \theta_1 \xrightarrow{\boldsymbol{\theta}(2)} 2(-\frac{1}{8}) - \frac{1}{4} = -\frac{3}{4}$

   $\boldsymbol{\theta}(3) = (-\frac{1}{4}, \frac{7}{4}) - \frac{1}{6}\,(-\frac{3}{4}, -\frac{3}{4}) = (-\frac{1}{8}, \frac{15}{8})$