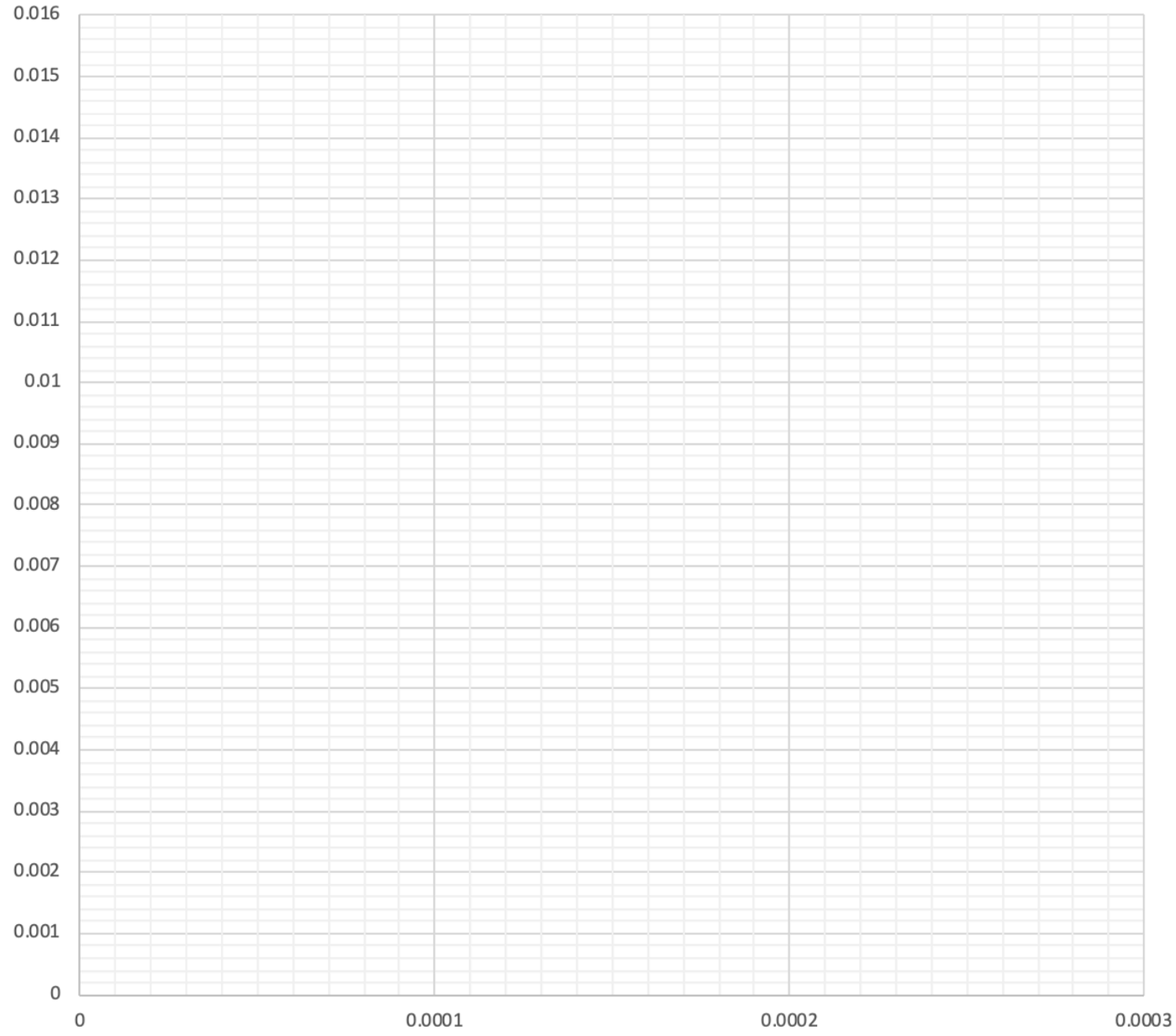
Exercise problem 1: dilute gas absorption

100 mol/hr of air containing 1% pollutant at 2 atm is to be cleaned of the pollutant such that at the end, its concentration is only 0.1%. A pure amine is being used as absorbent. Calculate number of stages if $L/G = 2\ (L/G)_{min}$. Calculate exit concentration of absorbent.

H_x = 100 bar



Exercise problem 2

100 mol/hr of flue gas containing 1.2% CO at 1 atm is to be cleaned of the CO such that at the end, its concentration is reduced by 20 fold. A pure absorbent is being used to remove CO. Calculate number of stages if L/G = 60. Calculate exit concentration of absorbent using Kremser equation.

$$y_A = \left(\frac{H_x}{P}\right) x_A = m x_A$$

H_x = 50 bar

$$N = \frac{\ln\left[\frac{1}{A} + \left(1 - \frac{1}{A}\right)\left(\frac{y_{N+1} - y_0}{y_1 - y_0}\right)\right]}{\ln A}$$

Exercise problem 3: concentrated gas absorption

100 mol/hr of air containing 15% pollutant at 2 atm is to be cleaned of the pollutant to reduce the concentration of pollutant to 2%. A pure amine is being used as absorbent. Calculate number of stages if $L_A/G_C = 2\ (L_A/G_C)_{min}$. Calculate exit concentration of absorbent.

$$y_A = \left(\frac{H_x}{P}\right) x_A = m x_A$$

H_x = 400 bar