# 最佳化理論 (EECN30124) Optimization Theory

MATLAB homework due by 2023/11/24

**Please submit the report and the program to E3**

1. Given the Rosenbrock function

$$f(\boldsymbol{x}) = 100(x_2 - x_1^2)^2 + (1 - x_1)^2$$

whose minimizer is at $[1,1]^{\mathrm{T}}$.

(a) Implement the steepest descent method with the line search algorithm from $(x_1^{(0)}, x_2^{(0)}) = [-1.2,1.0]^{\mathrm{T}}$. Please plot the trace $(x_1^{(k)}, x_2^{(k)})$

(b) Implement Newton's method with the line search algorithm from $(x_1^{(0)}, x_2^{(0)}) = [-1.2,1.0]^{\mathrm{T}}$. Please plot the trace $(x_1^{(k)}, x_2^{(k)})$ and compare the result with (b).