Section 7.1 — Problem A

Differentiate the power series representation of

$$f(x) = \frac{1}{1-x}.$$

Section 7.1 — Problem B

By using a power series representation, find y satisfying

$$y' + x = \sum_{n=1}^{\infty} nx^n \quad \text{and} \quad y(0) = 0.$$

Section 7.1 — Problem C

Using a software (Matlab, Python, for example), plot the Taylor polynomials T_4, T_{10} and T_{20} of the power series representation of $f(x) = \frac{1}{1-x}$.

Section 7.1 — Problem D

Express $x^2y'' + 2xy' - 3xy$ as a power series $\sum_{n=0}^{\infty} c_n x^n$.

Section 7.1 — Problem E

Express $xy'' + (4+2x)y' + (2+x)y$ as a a power series $\sum_{n=0}^{\infty} c_n x^n$.