

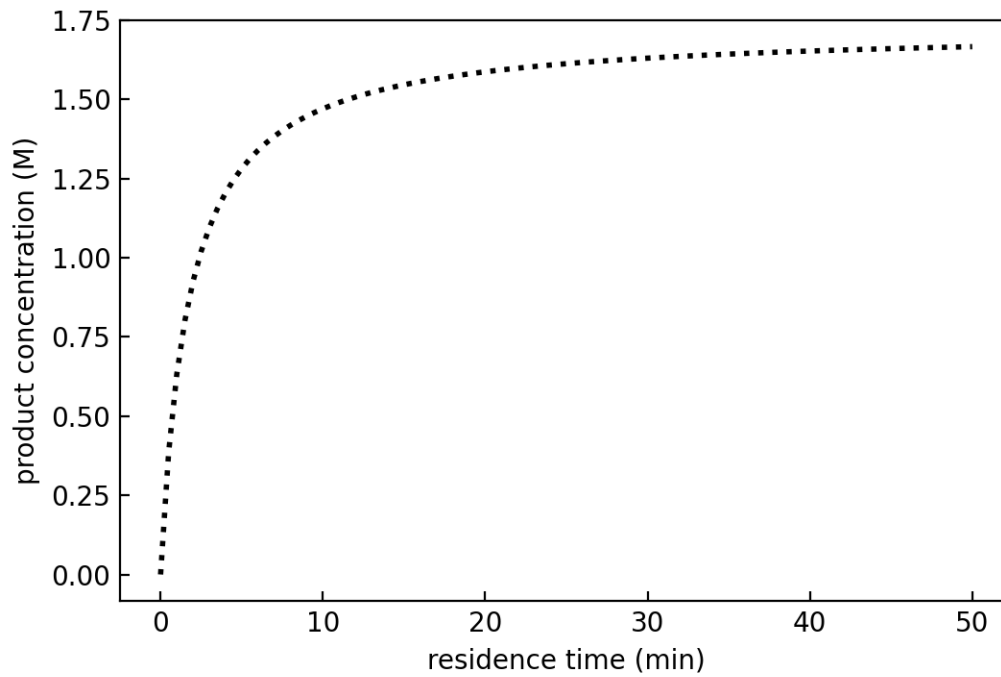
Plotting Practice Problems

Practice Problem 1

Create a script that plots the following product concentration profile in a chemical reactor:

$$C_B = \frac{k_1 \tau C_{A0}}{1 + k_1 \tau + k_2 \tau}$$

- Set the domain for the function as $t = 0$ to 50 with a step size of 0.5.
- Use the parameters, $C_{A0} = 2 \text{ M}$, $k_1 = 0.5 \text{ min}^{-1}$, $k_2 = 0.08 \text{ min}^{-1}$.
- Make a black dotted line with a 4 pt linewidth.
- Label the x-axis “residence time (min)”
- Label the y-axis “product concentration (M)”

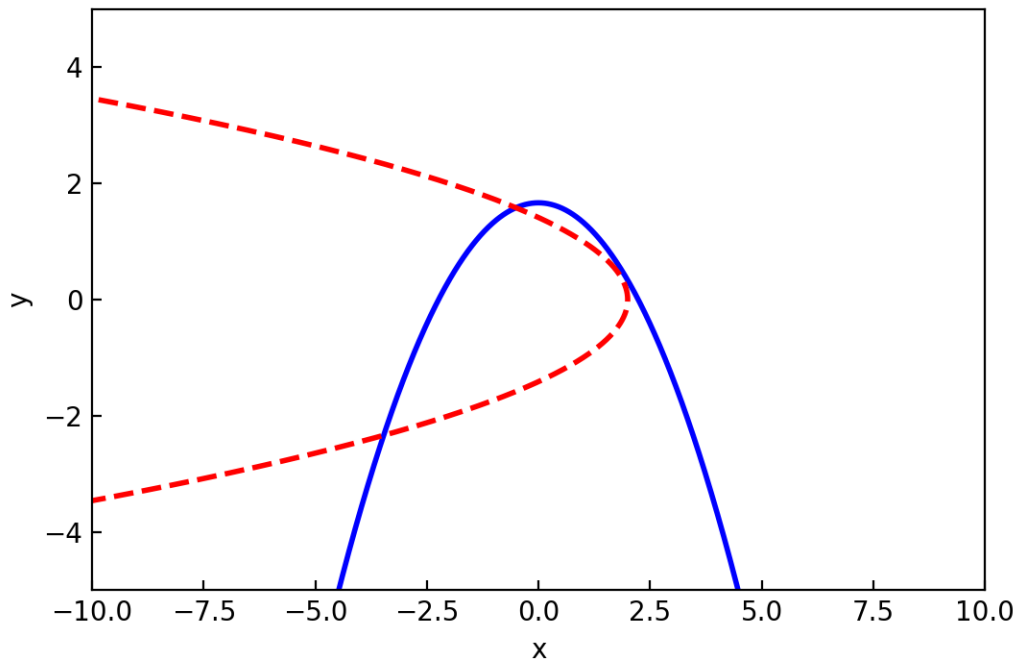


Practice Problem 2

We wish to plot the following system of equations to estimate a solution based on the intersection of the two equations:

$$\begin{aligned}x^2 + 3y &= 5 \\ y^2 + x &= 2\end{aligned}$$

A plot of this system is:



Create a script that replicates the above figure. I recommend that you create the data sets using the following functional forms:

$$\begin{aligned}y &= \frac{1}{3}(5 - x^2) \\ x &= 2 - y^2\end{aligned}$$

- For the first equation:
 - Use a range of x from -5 to 5 with a step of 0.01.
 - The line should be solid and blue with a 2 pt linewidth.
- For the second equation:
 - Use a range of y from -4 to 4 with a step of 0.01.
 - The line should be dashed and red with a 2 pt linewidth.
- Set the axes to the same values as those in the figure.