



Figure 1: Shows 100 linearly spaced points between 0 and 1, evaluated on the exact solution  $u(x) = 1 - (1 - e^{-10})x - e^{-10x}$ .

## 1 Problem 2 within project 1

We are looking to write a program that defines a vector of x-values, and a function that evaluates the exact solution over these values, the results of which will be stored in 2 columns, with a fixed amount of decimals, in scientific notation. This data will also be plotted separately.

### exact solution

we require a function that returns  $u(x)$  for an input  $x$ , such that:

$$u(x) = 1 - (1 - e^{-10})x - e^{-10x} \quad (1)$$

A function "analytic\_sol" is declared of type double, and so is it's (only) parameter "x". the function body evaluates and returns x within 1.