Project 8: Consider a d-c voltage source Vo (having an internal resistance of Rg) is applied to the input terminal of a transmission line terminated by an inductive load LL or a capacitive load CL at time t=0. The transmission line has a characteristic impedance of Zo (=Ro + jXo) and length of l. Plot the transient voltage V(z,t) of the transmission line at the input terminal as a function of time. Time (t) should be considered in the multiples of T, where T= l/u, l being the length of the transmission line, and u is the velocity of the wave through the line. The parameter values Vo, Rg, l, u, R0, X0, LL, CL will be provided from user-end.

Description:

This project involves the implementation of a simulation to plot the transient voltage of a transmission line when subjected to a step change in a direct current (d-c) voltage source. The circuit consists of a d-c voltage source (Vo) with an internal resistance (Rg) connected to the input terminal of a transmission line. The line is terminated by either an inductive load (LL) or a capacitive load (CL) at time t=0.

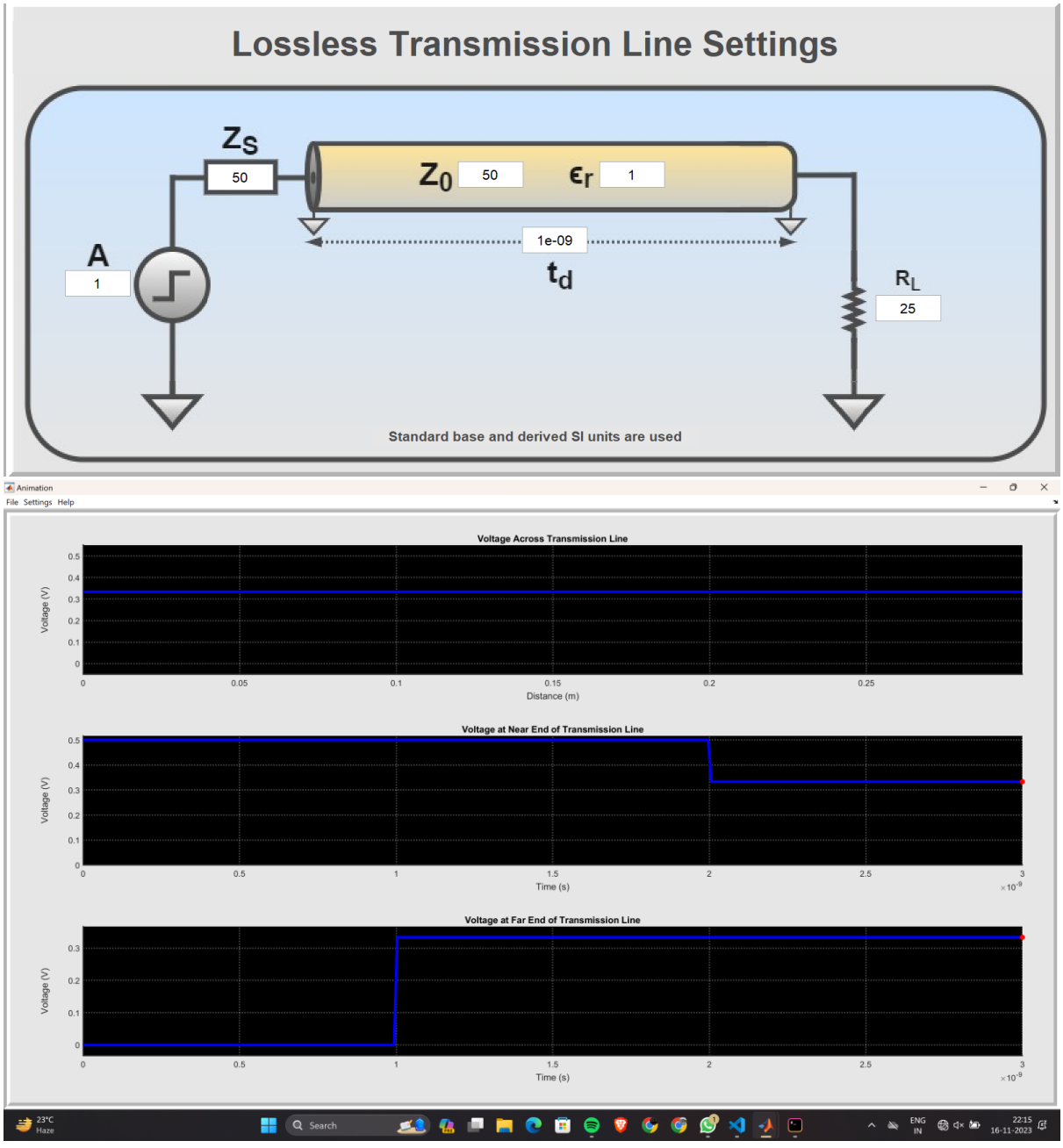
Key components of the transmission line include a characteristic impedance (Zo = Ro + jXo) and a length of l. The transient voltage (V(z,t)) of the transmission line at the input terminal is to be plotted as a function of time. Time (t) is considered in multiples of T, where T is the time it takes for the wave to travel the length of the transmission line (T = l/u), with l being the length of the line and u being the velocity of the wave through the line.

User-provided parameter values include Vo, Rg, l, u, Ro, Xo, LL, and CL. These values play a crucial role in determining the characteristics of the transmission line and the response to the applied voltage. The simulation will allow users to observe and analyze the transient behavior of the voltage along the transmission line under different conditions and load configurations.

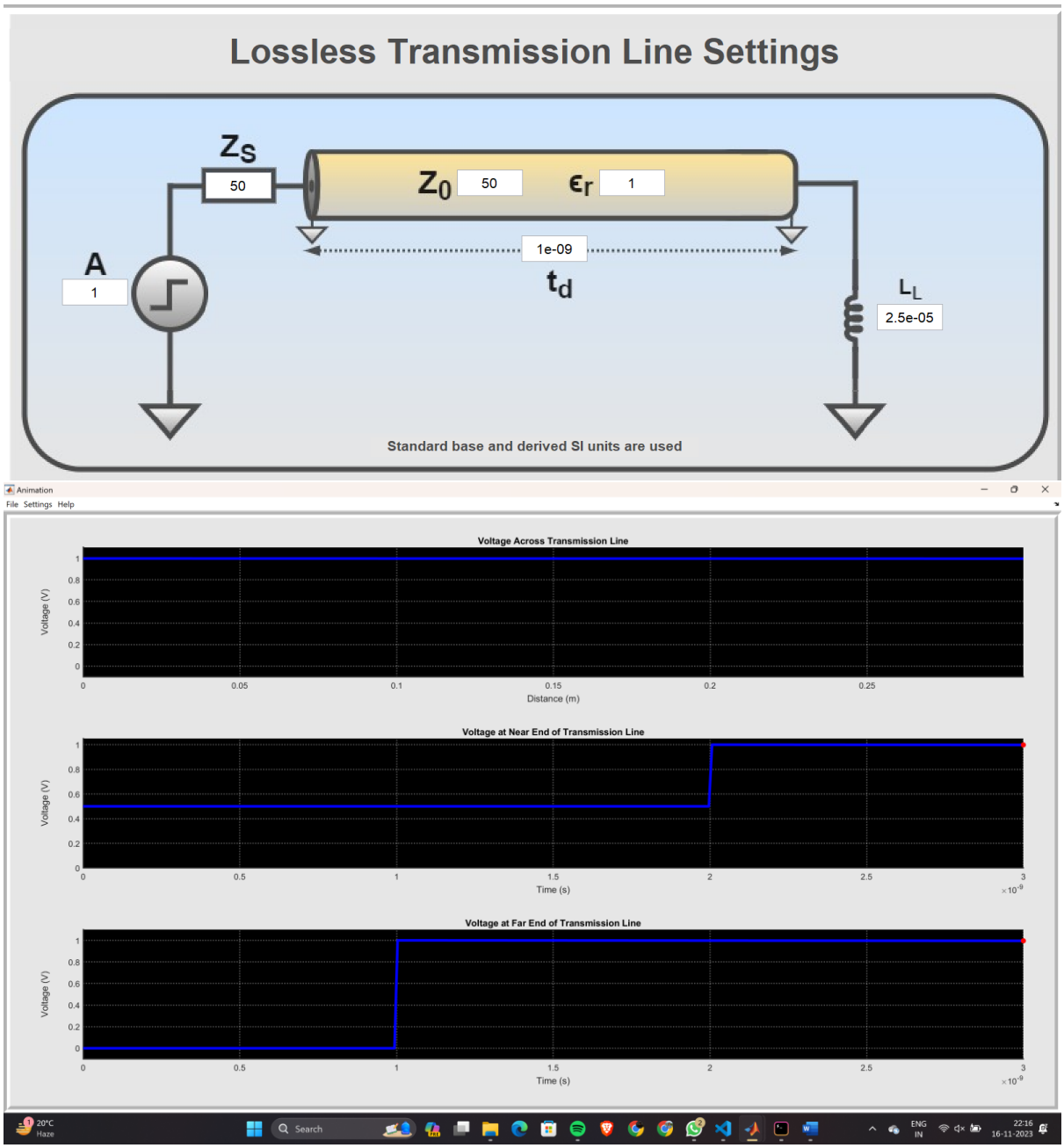
This project provides a valuable tool for understanding the dynamic response of transmission lines and can be used to optimize circuit parameters for efficient and stable power transmission.

Photos of outputs are pasted below:

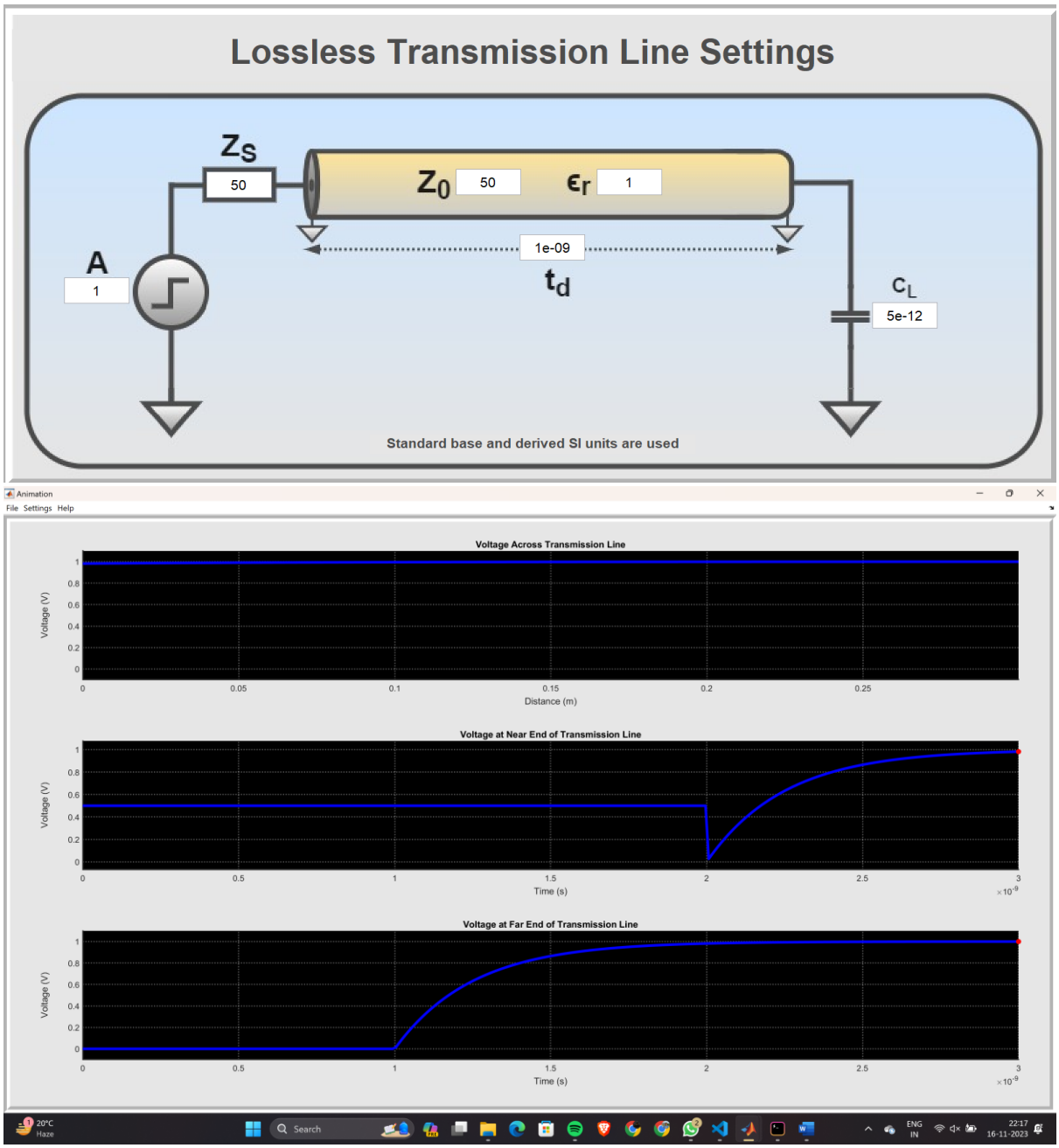
Pure resistive Load:



Pure Inductive Load:



Pure Capacitive Load:



To run code run :” tline_sim” in terminal of matlab with folde open in project folder