Lab Assignment 8

Given the following problems:

(i) Let $R = 1$ kΩ, $C = 1$ μF, find

(a) $v_C(t)$ for a series RC circuit with $v_C(0^-)=0$ and voltage source $V_s(0^+) = u(t)$ V.

(b) $v_C(t)$ for a parallel RC circuit with $v_C(0^-)=0$ and current source $I_s(0^+) = u(t)$ A.

(ii) Let $R = 1$ Ω, $L = 1$ mH, find

(c) $i_L(t)$ for a series RL circuit with $i_L(0^-)=0$ and voltage source $V_s(0^+) = u(t)$.

(d) $i_L(t)$ for a parallel RL circuit with $i_L(0^-)=0$ and current source $I_s(0^+) = u(t)$.

(iii) Repeat problem (i) with source changed to triangular pulse of height 1 and width 1 ms.

(iv) Repeat problem (ii) with source changed to triangular pulse of height 1 and width 1 ms.

Write codes using the following methods to solve them:

(i) Euler   (ii) mid-point (iii) RK2   (iv) RK4

NOTE:

1.$u(t$-$a)$ denotes the unit step function given by:

$$u(t-a) = \begin{cases} 1 & t \geq a \\ 0 & t < a \end{cases}$$

2. Continue computations until systems reach "steady" states.