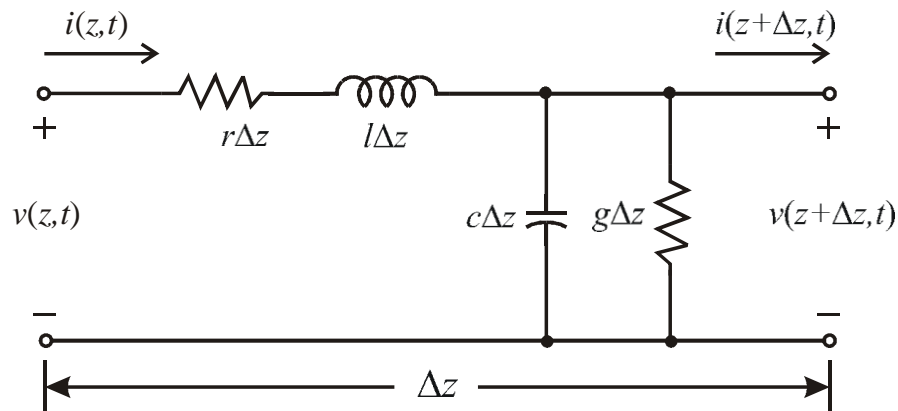


**Homework 2**  
**EE691-52 Applied EM- FDTD Method, Spring 2012**  
**Friday, February 03, 2012**



- 1) Find the update equations for the current and voltage along a lossy transmission line. A distributed circuit model for an incremental section of the lossy transmission line is shown above. As in the lectures, the update equations should be in standard form and put in terms of the characteristic impedance, Courant stability factor, and phase velocity.
- 2) For 1), evaluate the coefficients and write the update equations when  $v_p = 2.2 \cdot 10^8$  m/s,  $\Delta z = 2$  cm,  $S = 0.5$ ,  $Z_C = 50 \Omega$ ,  $r = 1 \Omega/\text{m}$ , and  $g = 10^{-3}$  S/m.
- 3) Find the update equations for a series RL load in series with a lossless 1-D transmission line. As in the lectures, the update equations should be in standard form and put in terms of the characteristic impedance, Courant stability factor, and phase velocity.
- 4) For 3), evaluate the coefficients and write the update equations when  $v_p = 2.2 \cdot 10^8$  m/s,  $\Delta z = 2$  cm,  $S = 0.5$ ,  $Z_C = 50 \Omega$ ,  $R = 30 \Omega$ , and  $L = 10^{-9}$  H.
- 5) Find the update equations for a parallel RL load in parallel with a lossless 1-D transmission line. As in the lectures, the update equations should be in standard form and put in terms of the characteristic impedance, Courant stability factor, and phase velocity.
- 6) For 5), evaluate the coefficients and write the update equations when  $v_p = 2.2 \cdot 10^8$  m/s,  $\Delta z = 2$  cm,  $S = 0.5$ ,  $Z_C = 50 \Omega$ ,  $R = 30 \Omega$ , and  $L = 10^{-9}$  H.

Show **all** work for full credit.

Due Wednesday, February 8, 2012