甲、Describe KCL and KVL (Kirchhoff's Laws) (10%); in what conditions both laws sustain. (5%)

乙、Describe the superposition principle (5%); in what conditions the superposition principle sustain and prove it. (10%)

丙、In Figure A, $v_s(t)$= u(t) (a unit step function), $i_1(0)$= 1, $i_2(0)$=0.6, $v_c(0)$= 0.5, solve $i_2(t)$ by using the transformed circuit method (10%), write down the differential equation and solve $i_2(t)$ by using Laplace transform method.(10%) Both methods should conclude the same answer.

丁、Derive Y-Δ transformation formula by using node analysis. (20%).

戊、Describe Thevenin's and Norton's Theorems. (10%).

己、In Figure B, $v_s(t)$= cos(2t)u(t) (u(t) is a unit step function), $i_1(0)$= $i_2(0)$=0, find ), $i_1(t)$ and $i_2(t)$. (20%)

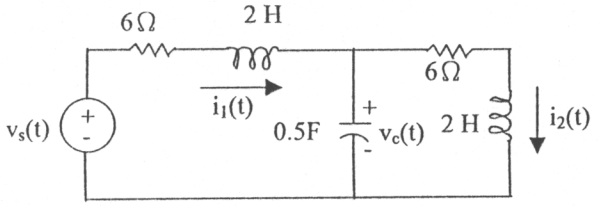


Figure A

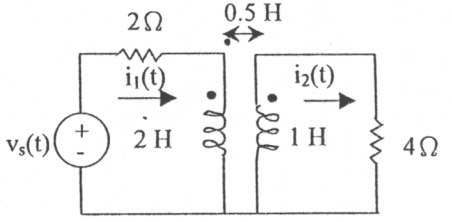


Figure B