C2 6E-9





1.1: For the above circuit, determine the equivalent capacitance between A and B



1.2: For the above circuit, determine the equivalent inductance between A and B

## 2) Amplifier circuits



2.1: For the RL amplifier circuit, determine the relationship between Vout and Vin. As with RC amplifier circuits, KCL is a good starting point. (The power is taken out for simplicity but the op amp is powered).

2.2: What type of op amp is this?



2.3: In the above circuit V1=V2=1sin( $2\pi$  f t) where the frequency is 1 kHz. Determine Vout.

3) Voltage/Current continuity



In the above circuit, the voltage is defined as follows:

$$V1 = \begin{cases} 5V & t < 0 \\ 10V & 0 < t \end{cases}$$
 (the voltage source turns on at t = 0)

3.1: Determine a mathematical expression for the source.

3.2: At t =0- (just before the voltage changes), for the polarities indicated, determine the voltage across each component and the current through each component.

3.3: At  $t=0^+$  (just after the voltage changes), determine the voltage across each component and the current through each component for the polarities indicated in the circuit.

4) First order circuits



- 4.1: Determine the voltage as a function of time for the source voltage V1 = 10 u(t).
- 4.2: Determine the voltage as a function of time for the source voltage

5. First order switching circuit



In the above circuit, the voltage source turns on at t = 0. Switch U1 closes at t = 0.1 ms. Switch U2 closes and switch U3 opens at t = 0.3 ms (effectively putting resistor R3 in series with C3 at t = 0.3 ms).

5.1: Determine the voltage across R3 as a function of time for t > 0.