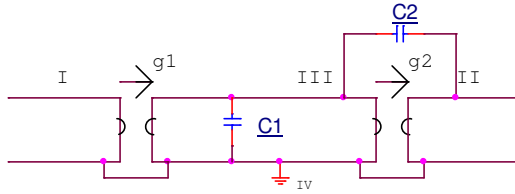


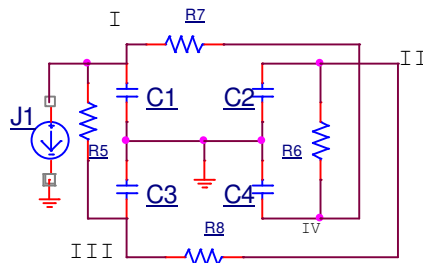
610 Fall 2017 – Homework 2 Due Th 09/21/17

1. (60 points; indefinite Y and transfer function)



- For the above 2-port find the indefinite Y matrix, ground node IV and eliminate node III to get the 2-port $Y(s)$. Take port 1 on the left and port 2 on the right.
- From $Y(s)$ put an input voltage at the left port and take the output as the voltage at the right port (all referenced to ground) when loaded (at port 2) in a resistor of resistance R . Give the resulting voltage transfer function.
- Under the conditions of part b) give the poles and zeros of $V_{II}/V_I(s)$ and
- the impulse response of the circuit.

2. (40 points, dual circuits and Indefinite Y)



- For this circuit draw a graph and number the branches as per the components and with orientation toward the ground and to the right (except 5 & 6 down; combine $J1$ with $C1$ as one branch). Choose capacitor branches for a tree. Discuss the planarity of this graph.
- Give the cut-set and tie-set matrices, the branch by branch admittance, and from those give semis-state equations using $x=[v_t^T, i_l^T]^T$ with current source $J1$ as input, u , and voltage of node II [with respect to ground] as output, y .
- Assume all capacitors equal, of capacitance C , and all resistors equal of resistance R and find the transfer function $y/u(s) = v_{II}/J1$.

