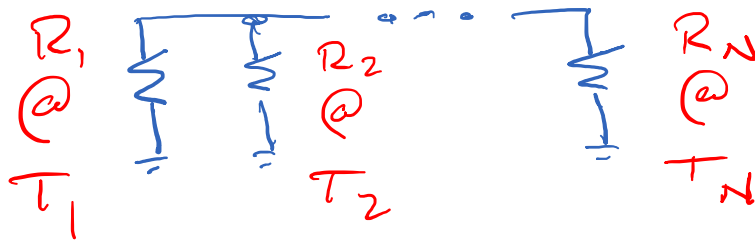


PS 5

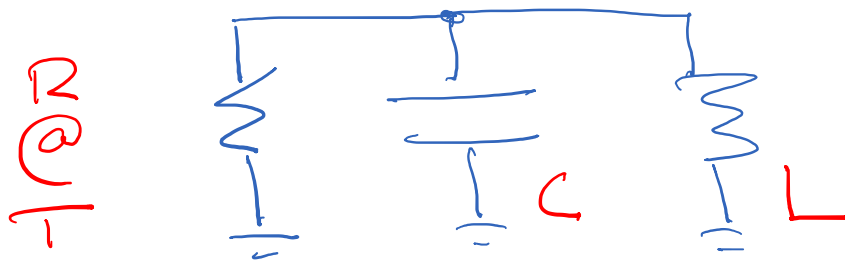
1. CONSIDER A CIRCUIT THAT CONSISTS OF
 N RESISTORS $R_1, R_2, \dots, R_N$ IN PARALLEL,
EACH AT A DIFFERENT TEMPERATURE $T_1, T_2, \dots, T_N$.



EXPRESS AS A SINGLE RESISTANCE

R_{eff} AT TEMPERATURE T_{eff}

2.



STARTING FROM THE JOHNSON NOISE POWER SPECTRAL DENSITY OF THE RESISTOR, CALCULATE THE MEAN-SQUARE VOLTAGE ACROSS THE CIRCUIT. COMPARE WITH THE EQUIPARTITION RESULT.

3. LOOK UP THE DATASHEET FOR THE
AD797 LOW-NOISE OP AMP.

WHAT IS THE OPTIMAL SOURCE RESISTANCE
THAT MINIMIZES OP-AMP ADDED NOISE?
CONSIDER AN OPERATING FREQUENCY OF 1 kHz.

FOR A NOISE-MATCHED SOURCE, WHAT IS
THE NOISE TEMPERATURE OF THE OP AMP?
WHAT IS THE NOISE FIGURE?