

EE 521: Homework 4

1. Prove that the maximum delivered power to a resistive load R_L is obtained if the source resistance, R , is matched with R_L .
2. Prove Frii's formula.
3. Given the circuit in Figure 1 and assuming $T = 290\text{K}$.

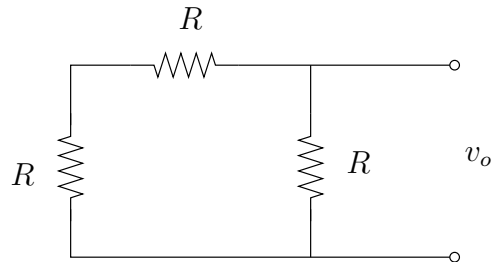


Figure 1: Noise figure calculation

- (a) Sketch the noise equivalent circuit.
 - (b) find the rms noise voltage appearing at the output terminals in a 100kHz bandwidth using Nyquist's Formula.
4. A preamplifier, with power gain to be found, having a noise figure of 2.5dB is cascaded with a mixer with a gain of 5dB and a noise figure of 8dB. Find the preamplifier gain such that the overall noise figure of the cascade is at most 4dB.