

ECE424F

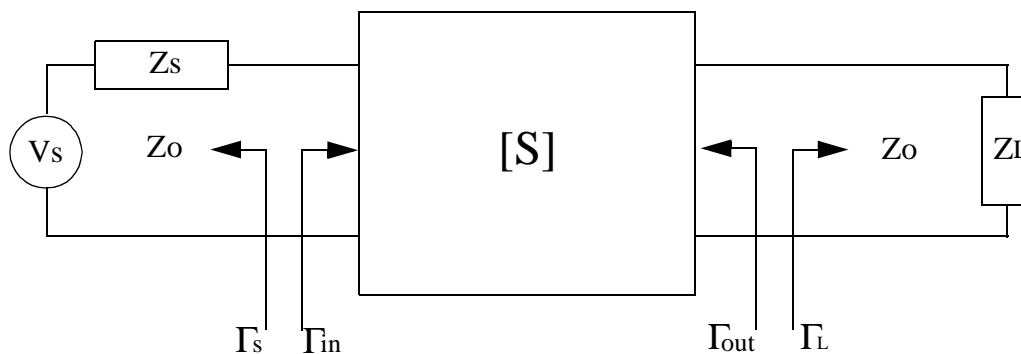
MICROWAVE CIRCUITS

HOMEWORK #9

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Problem 1.

Consider a microwave amplifier characterized by a 2X2 scattering matrix [S] at a given frequency. The amplifier is fed by a source V_s having an internal impedance Z_s and is connected to a load Z_L as shown below. The system impedance level is $Z_o=50\Omega$



(i) Assuming that $Z_s=Z_o$, show that the available power from the source is given by

$$P_{avs} = \frac{1}{2}|a_1|^2.$$

(ii) Under the same assumption of $Z_s=Z_o$, calculate the power delivered to the load P_{load} in terms of S_{ij} , Γ_L and V_s .

(iii) Based on steps (i) and (ii), derive an expression for the corresponding transducer power gain $G_T=P_{load}/P_{avs}$.

Problem 8.9

Problem 8.12

Problem 8.14