

Special Problem 5.1-1

The **impedance** of the load in the circuit below is **dependent** on **frequency** f :

$$Z_L(f) = 3f^2 + j\frac{5-f}{2} \quad \Omega$$

where f is frequency in GHz.

The characteristic impedance Z_0 of the lossless transmission line is **unknown**.

What is known is that at **one** specific frequency f , a **perfect match** occurs (i.e., $\Gamma_L = 0$).

Determine the **frequency** at which this perfect match occurs, **and** the value of **characteristic impedance** Z_0 .

