

Impedance Matching

Electrical Engineering

Matching any load to the line, with reactance, transformers or stubs.

A match is arranged at one frequency; bandwidth is what it costs.

1

Normalise the load

Divide Z_L by Z_0 so matching becomes a move towards $1 + j0$.

2

Cancel the reactance

A series or shunt element moves the load onto the unit conductance circle.

3

Transform the resistance

A quarter-wave section of $\sqrt{Z_0 Z_L}$ matches two real impedances.

4

Or fit a stub

A shorted or open stub supplies exactly the cancelling susceptance needed.

5

Check the bandwidth

The tighter the match, the narrower the band; cascade sections to widen it.

Matching maximises power into the load and suppresses reflections. Those are two views of the same condition, not two goals.