1. Impedance is the complex-valued generalization of resistance. When the capacitor or the inductor is applied on a circuit, it changes the phase and amplitude of sinusoidal alternating current. We call this opposition of change in current or voltage, reactance

We consider these capacitive reactance () or inductive reactance (), to actually calculate the opposition of complex circuit, using phasor notation.

Impedance .

Impedance matching is the practice of designing the input impedance of an electrical load or the output impedance of its corresponding signal source to maximize the power transfer or minimize signal reflection from the load.

Maximum power transfer is obtained when , and minimum reflection is obtained when where is complex source impedance, and is load impedance.

2.

1) In this experiment, we want to enhance performance of our loudspeaker. In order to have better output, we need impedance matching of speaker and amplifier. We can maximize power transfer or transfer clearer signal by changing impedance of amplifier.

2) If impedance matching is not considered, signal reflection may distort the sound or smaller output is obtained

3. The impedance of a speaker is determined by the number of coil turns in voice coil. Since a coil (inductor) have impedance value of where , (N is the number of coil turns, r is the radius of the coil, and l is the length of the coil.)

Of course, impedance changes due to frequency of the signal, we match impedance for all frequency band. We need to decide the number of coil turns to the frequency we are interested.

4.