

# **UNIT-5**

## **(Lecture-1)**

### **Introduction to Active Network Synthesis**

## Frequency Characteristics of AC Circuits

- Introduction
- A High-Pass  $RC$  Network
- A Low-Pass  $RC$  Network
- A Low-Pass  $RL$  Network
- A High-Pass  $RL$  Network
- A Comparison of  $RC$  and  $RL$  Networks
- Bode Diagrams
- Combining the Effects of Several Stages
- $RLC$  Circuits and Resonance
- Filters
- Stray Capacitance and Inductance

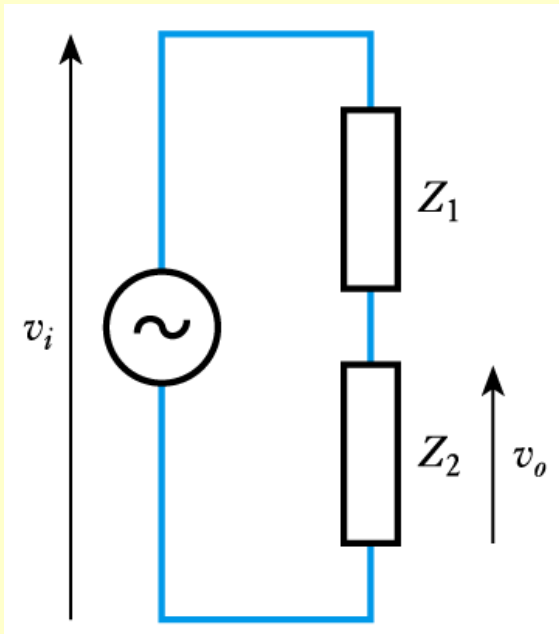
## Introduction

- Earlier we looked at the **bandwidth** and **frequency response** of amplifiers
- Having now looked at the AC behavior of components we can consider these in more detail
- The reactance of both inductors and capacitance is **frequency dependent** and we know that

$$X_L = \omega L$$

$$X_C = \frac{1}{\omega C}$$

- We will start by considering very simple circuits
- Consider the potential divider shown here



- from our earlier consideration of the circuit

$$V_o = V_i \times \frac{Z_2}{Z_1 + Z_2}$$

- rearranging, the gain of the circuit is

$$\frac{V_o}{V_i} = \frac{Z_2}{Z_1 + Z_2}$$

- this is also called the **transfer function** of the circuit