

Dr. Mohamed Bakr, EE2C15, 2007

Note Title

10/2/2007

# Lecture 11

From Sections 5.1 and 5.2  
of Textbook

Solve E5.1, E5.2, 5.2, 5.6, 5.10,  
5.13, 5.14, 5.21

# Linearity

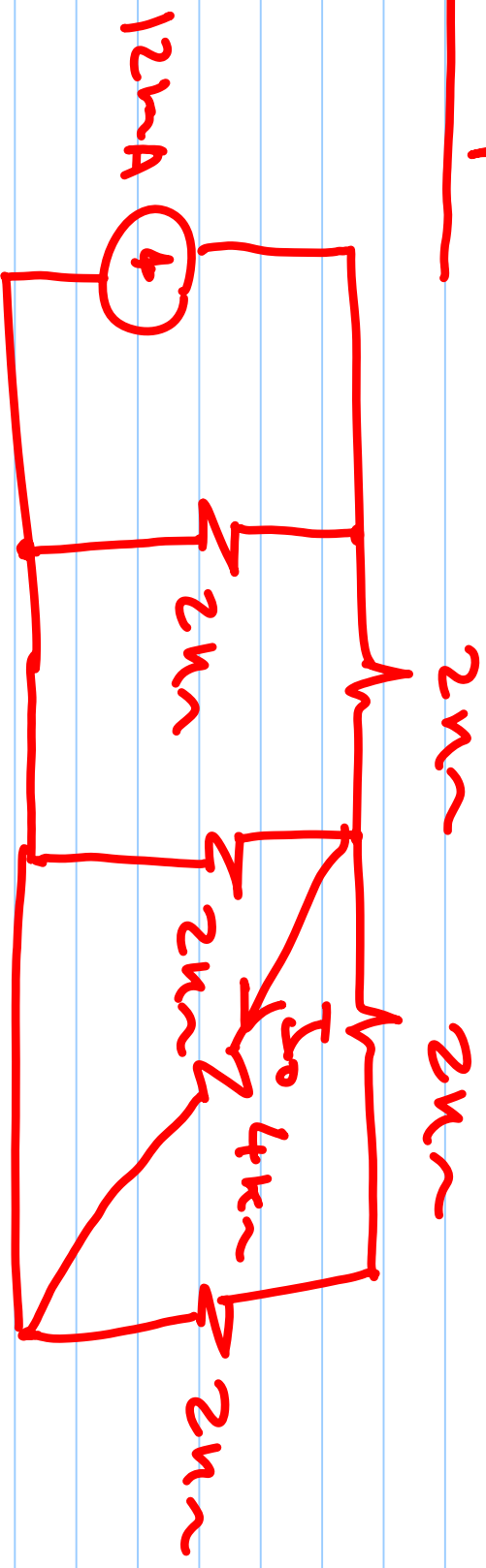
\* All circuits addressed in this course are linear circuits

\* They are expressed through linear algebraic equations

\* They satisfy the conditions of additivity and scaling

$$f(\alpha x) = \alpha f(x) \text{ and } f(x_1 + x_2) = f(x_1) + f(x_2).$$

## Example



Find  $I_o$  Using Linearity and  
the assumption  $I_o = 5\text{mA}$ .

## Superposition

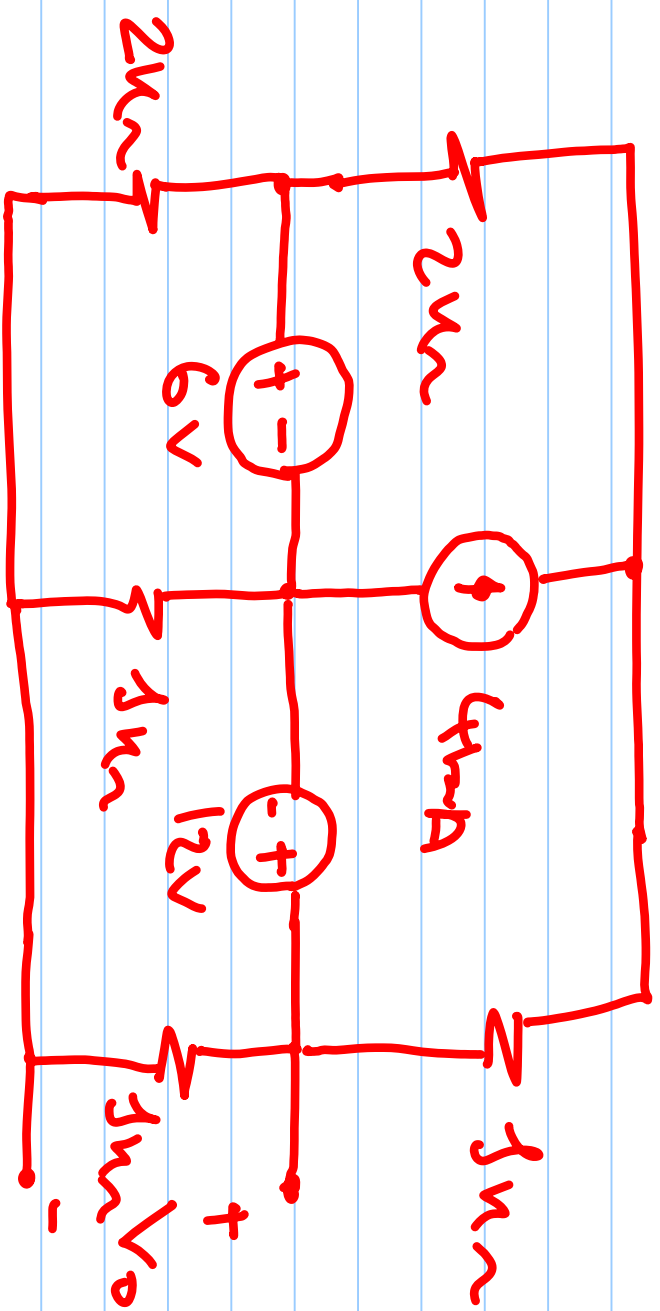
\* If a circuit contains more than one source, then the currents and voltages everywhere are due to all sources

\* We can consider one source at a time and then superimpose the currents and voltages

## Superposition (Cont'd)

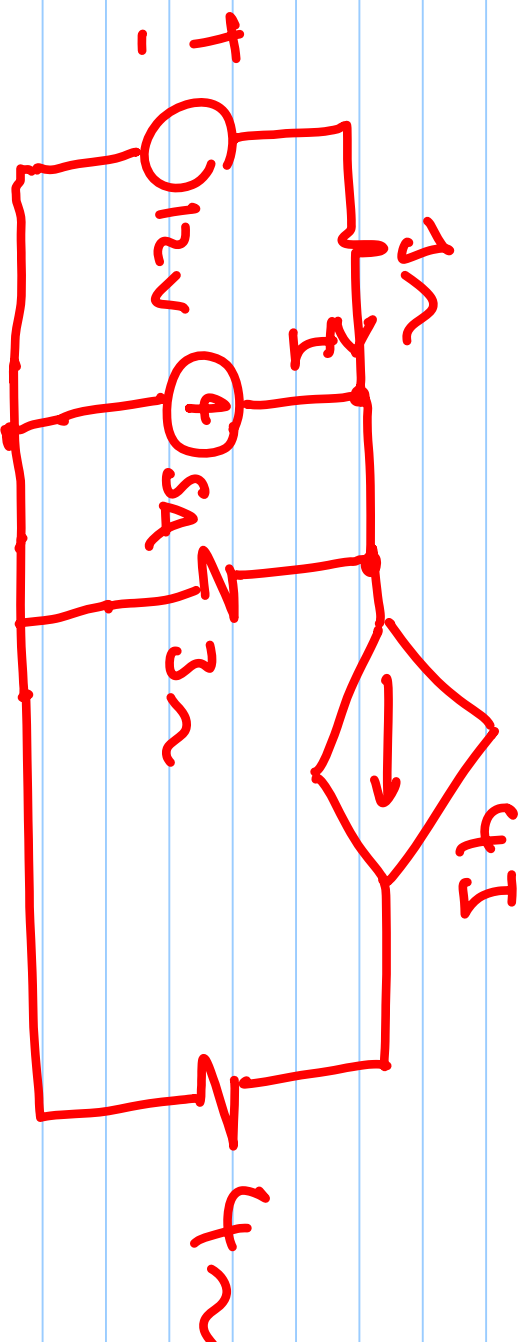
- \* If a voltage source is removed, it is short circuited
- \* If a current source is removed, it is open circuited
- \* Superposition is useful when having independent sources.

# Example



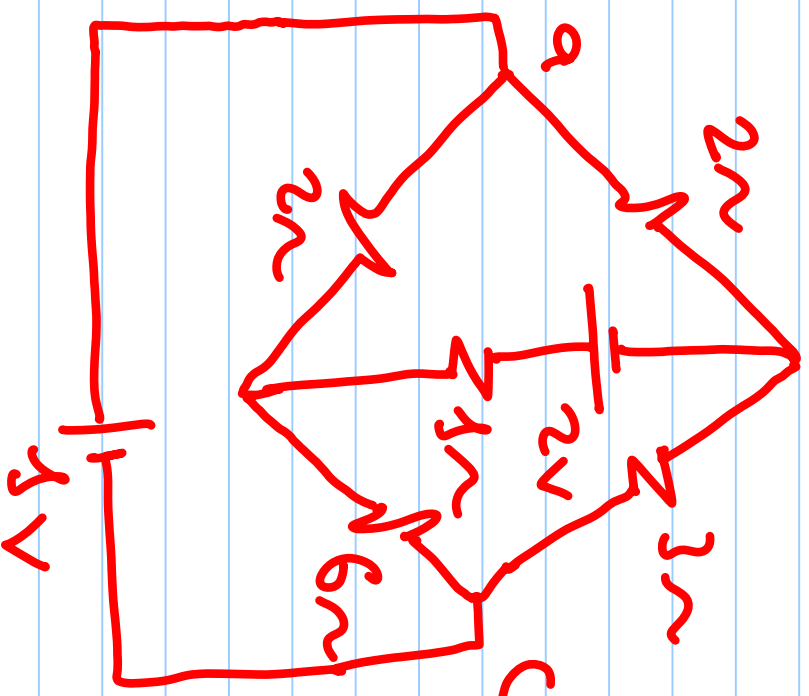
Find  $V_o$  using superposition

# Example



Find the current in the 4Ω resistor  
using superposition

## Example



Show through superposition that no current flows through the 3Ω resistor