**6.002 Demo# 05 ( Load set up Demo#05.set )**
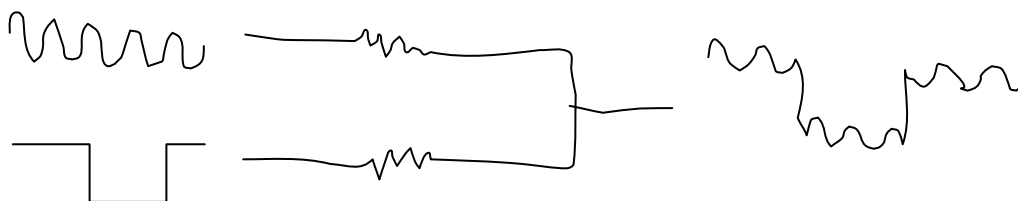
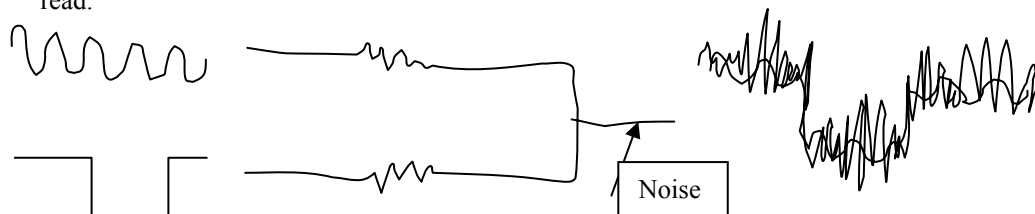# Superposition Using Resistors       Agarwal    Fall 00
# Lecture 4

Purpose:  This demo is shown as a precursor to the intro to digital class, to motivate the use of digital logic. This demo illustrates superposition using a simple 2-source, 2-resistor network.  We can show the two inputs (a square wave and a sine wave) on the scope, along with the output.  The output is obviously a linear combination of the inputs, but this point can be made clearer by switching off the inputs individually and examining the corresponding output.  This demo was used in the context of analog signal processing, and to motivate the digital abstraction.

Steps:
1. Show on the scope the two input signals (square wave and sinusoid) and the resulting "adder" output.
2. Turn off each source independently to demonstrate superposition.



3. This part is not demo'd, rather just drawn on the board. If the output is corrupted by noise, then it is hard to read.



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**Description: Superposition using resistors**

  Note: See schematic diagram next page for more detail

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**Oscilloscope Setup**

| CH | V/DIV | OFFSET | MODE | FUNC | MATH | VERTICAL | HORIZONTAL |
|---|---|---|---|---|---|---|---|
| 1 on | 2 | 6 | DC | off | | | |
| 2 on | 2 | 6 | DC | off | | | |
| 3 on | 2 | 0 | DC | off | | | |
| 4 off | 2 | 6 | DC | off | | | |
| **Horizontal:** 200 μ | | **Acquisition: AUTO AUTO 4** | | | | **Trigger:** | **CH1** |

| UNIT | WAVE | AMP | OFFSET | FREQ | +6 | +25 | -25 | OUTPUT |
|------|------|-----|--------|------|-----|-----|-----|--------|
| On  FG1 | Sine | 2 | 0 | 20 KHZ @ 50 Ohm | | | | |
| On  FG2 | Square | 2 | 0 | 1 KHZ @ 50 Ohm | | | | Trigger:  INT, INT |

## Superposion Using Resistors          Spring 99