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ENEE 417 - Spring 2018
Week #4 starting W 02/21/18
Designs #2: Ring and Phase Shift Oscillator Designs; Spice Design

In this experiment a good reference is Sedra and Smith (pages 1239 & 1345 of the 6th edition) [pages 1275 and 1393 of the 7th edition].
For the active devices use the 4007 CMOS transistor package and 1458 Op-Amps.

1. Construct both a three stage and a five stage ring oscillator and record via the scope/computer interface the oscillations. Check the results of Figure (15.28 of 6th) [16.28 of 7th] of the above references.

Insert various capacitors at the outputs of the stages and see the effects. Among the capacitor values use one of the super-capacitors (whose values are on the order of Farads). Check also the effect of using an even number of stages.

2. Using an Op-Amp amplifier realize the phase shift oscillator of Fig. (17.7 of 6th)[18.9 of 7th] using R=10Kohm and C as 15nFd = 15,000pFd and 18nFd.

3. In Spice use MOSIS 1.6u level 4 CMOS model parameters, available in the bicmos12.lib files, to design a three stage inverter ring oscillator (for this adjust the W and L so that a symmetric bias yields zero output voltage for zero input voltage; make sure that both W and L are bigger than 7microns).