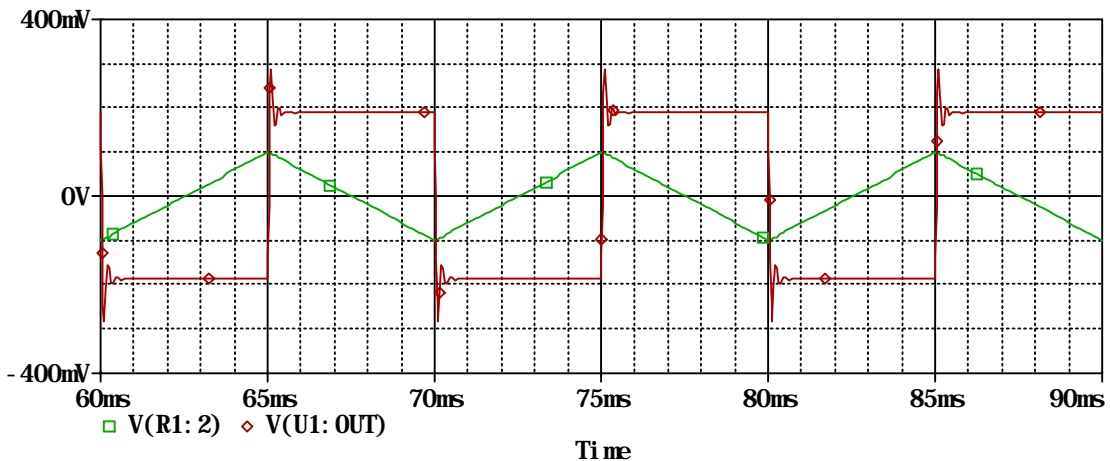
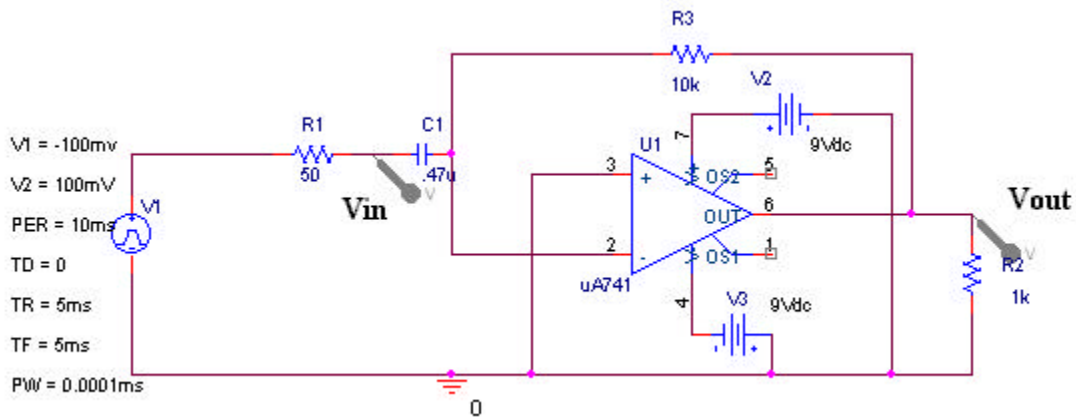


Homework #4
Op-Amp Differentiator

We have studied the practical Miller integrator circuit, in which there is a feedback resistor, in Experiment 8. Now we will consider a simple example of an op-amp differentiator. Model the following circuit in Pspice, using the VPULSE part in the Source library and the parameters shown to generate a triangular wave. Do a transient analysis which produces the results below and quantitatively describe how you know that the circuit is behaving as a differentiator. Change the value of the feedback resistor to 1k and run the transient again, next, change its value to 100k and run it a third time. Discuss two effects changing the value of the feedback resistor has on the output signal. For which value of the feedback resistor (1k, 10k or 100k) are the non-ideal characteristics of the output voltage most pronounced?



Note: In the VPULSE source model, V1 is the negative voltage for the pulse, V2 is the positive voltage, PER is the period, TD is a time delay from zero, TR is the time for the rising edge of the pulse, TR is the time for the falling edge of the pulse and PW is the width of the pulse.