Rough Marking Scheme for Switched-Capacitor Lab

This lab should be written up in groups of two.

[10] Calculation of component values: R_1,R_2,R_3,R_4, C_{R1},C_{R2},C_{R3},C_{R4}, C_{clock}. Equations, descriptions are all given in the lab notes.

[20] Frequency Response sketch DC to $2f_{clock}$ for both Q=1 and Q=10 case, (not required to be very detailed)

Comments on comparison to theory, where theoretical plots for the continuous filter are given in the lab handout. Realization of what is being measured, i.e., is output frequency the same as the input frequency?

[30] Observation, understanding, explanation of aliasing, replication, sinx/x.

- note, can use the info in the lab handout, as the theory, but you need to add your own observations and explanation from what you measured and saw in the lab.

- Would expect a paragraph or so for each plus some sketches or plots of lab experimental results, etc.

- explanations for each should be in both time-domain and frequency domain, that is:

* in the time domain (on an oscilloscope) or in the frequency domain (on a spectrum analyzer, or using fft function in the lab), how can you tell there is replication, aliasing, sinx/x, what happens to these as you change frequency with respect to clock frequency.

[20] Sketch of transient response for both Q=1 and Q=10, comparison to plot in lab handout for Q=1. Need fairly careful plot of Q=1 to show time to reach peak, overshoot, etc. It is very hard to synchronize the scope so steps can be seen, so this is not required, but it is nice if this is possible.

[20] Finish the derivation of the theoretical step response starting from z domain transfer function as given in course handouts. This was nearly completed for you in the handout except there were no numbers in the equation.

Calculate the step response, e.g., for a step from 0 V to -1 V, the output will go to +10V. Compare to continuous, as in lab notes.