

DUAL SLOPE ADC

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Abstract- The design of dual slope ADC is proposed in this project is used to convert the given analog input to digital output, and also reduce the noise present in the input voltage by averaging. Control logic is used to give analog input and up counter present in the circuit gives the digital output. In dual slope type ADC, the integrator generates two different ramps, one with the known analog input voltage V_A and another with a known reference voltage $-V_{ref}$. Hence it is called a dual slope A to D converter.

Keywords- control logic, up counter.

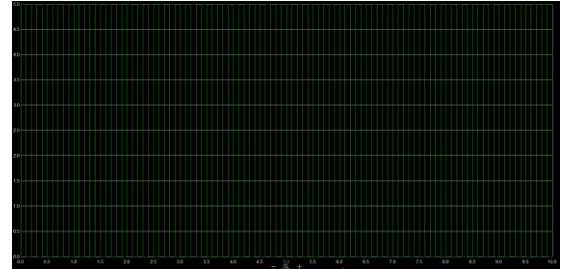
Reference circuit details:

In a dual-slope ADC as drawn in Figure 1, the entered signal is applied to an integrator. At the equal time, a counter starts counting clock pulses. After a predetermined amount of time (T), a reference voltage with opposite polarity is utilized to the integrator. At that instant, the amassed cost on the integrating capacitor is proportional to the common cost of the input over the interval T as shown in Figure 2. The indispensable of the reference is an opposing ramp with a slope of V_{ref}/RC . Simultaneously, the counter is again counting from zero. When the integrator output reaches zero, the counter stops, and the analog circuitry is reset. Since the charge won is proportional to $V_{in} \times T_1$, and the equal quantity of cost lost is proportional to $V_{ref} \times T_2$, then the number of counts relative to the full-scale depend is proportional to T_2/T_1 , or V_{in}/V_{ref} . If the output of the counter is a binary number, it will consequently be a binary illustration of the input voltage.

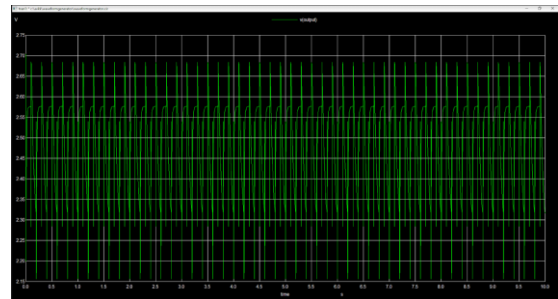
The dual-slope ADC has the following advantages:

- Noise present on the input voltage is reduced by averaging.
- The values of the capacitor and conversion clock do no longer affect conversion accuracy when you consider that they act equivalently on the up-slope and down-slope.

Input wave form :



Output wave form:



References:

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