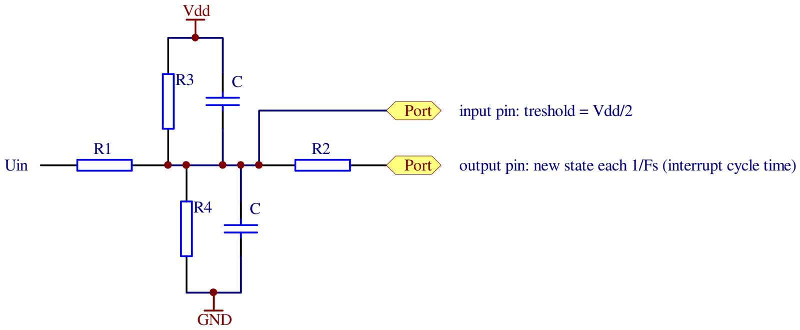

Design Equations

$$Uinmax = \frac{Vdd}{2} * \left[1 + \frac{R1}{R2} - \frac{R1}{R3} + \frac{R1}{R4} \right]$$

$$Uinmin = \frac{Vdd}{2} * \left[1 - \frac{R1}{R2} - \frac{R1}{R3} + \frac{R1}{R4} \right]$$

Step 1

Select Uinmax, Uinmin and R1 and calculate R2

$$Uinmax - Uinmin = Vdd * \frac{R1}{R2} \longrightarrow R2 = \frac{Vdd}{Uinmax - Uinmin} * R1$$

$$Uinmax + Uinmin = Vdd * \left[1 - \frac{R1}{R3} + \frac{R1}{R4} \right]$$

Step 2

If (Uinmax + Uinmin) > Vdd

$R3 = \infty$ (eg. leave R3 out)

$$R4 = \frac{Vdd}{(Uinmax + Uinmin) - Vdd} * R1$$

If (Uinmax + Uinmin) < Vdd

$R4 = \infty$ (eg. leave R4 out)

$$R3 = \frac{Vdd}{Vdd - (Uinmax + Uinmin)} * R1$$

If (Uinmax + Uinmin) = Vdd

$R3 = \infty$ (eg. leave R3 out)

$R4 = \infty$ (eg. leave R4 out)

Step 3

Calculate 1 / Rp

$$\frac{1}{Rp} = \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3} + \frac{1}{R4}$$

Step 4

Calculate Cp and C for input bandwidth Fin

$$Cp = \frac{1}{2 * pi * Fin} * \frac{1}{Rp}$$

$$C = Cp / 2$$

Step 5

Calculate oversample frequency for given bit resolution N

$$Fs = \frac{2^{N-2}}{Cp * Rp}$$

Calculate total conversion time

$$Tc = \frac{2^N}{Fs} = 4*Cp*Rp$$