



Where  $R_a$  is known (e.g. 750 k $\Omega$ ), and:

$$V_{out} \propto V_{opamp}^{-1}$$

$$V_{opamp,min} \leq V_{opamp} \leq V_{opamp,max}$$

$$V_{out,min} \leq V_{out} \leq V_{out,max}$$

Currents through resistors:

$$i_a = \frac{V_{out} - 1}{R_a} \quad i_b = \frac{1}{R_b} \quad i_c = \frac{V_{opamp} - 1}{R_c}$$

Using Kirchhoff's Current Law:

$$i_a + i_c = i_b$$

$$\frac{V_{out} - 1}{R_a} + \frac{V_{opamp} - 1}{R_c} = \frac{1}{R_b}$$

Substituting:

$$\frac{V_{out,max} - 1}{R_a} + \frac{V_{opamp,min} - 1}{R_c} = \frac{1}{R_b}$$

$$\frac{V_{out,min} - 1}{R_a} + \frac{V_{opamp,max} - 1}{R_c} = \frac{1}{R_b}$$

$$\frac{V_{out,max} - 1}{R_a} + \frac{V_{opamp,min} - 1}{R_c} = \frac{V_{out,min} - 1}{R_a} + \frac{V_{opamp,max} - 1}{R_c}$$

Finally:

$$R_c = R_a \frac{V_{opamp,max} - V_{opamp,min}}{V_{out,max} - V_{out,min}}$$