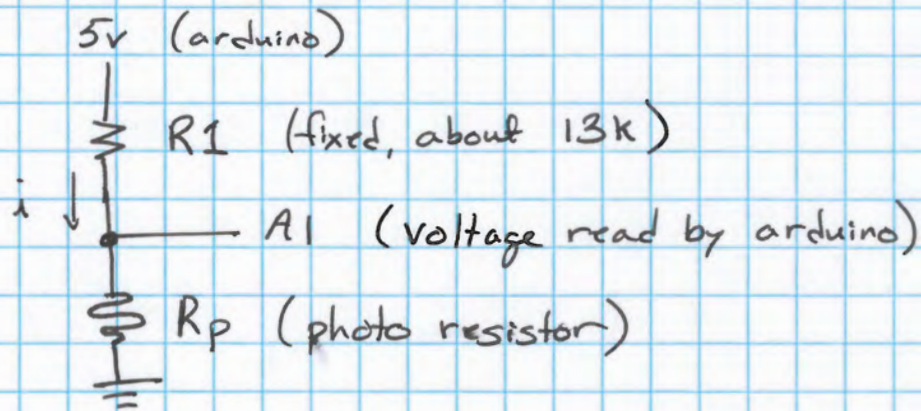


Photo-Resistor Voltage divider



Current I_{total} : $V = IR$, $I = \frac{V}{R} = \frac{5V}{R_1 + R_p}$ (1)

Voltage signal A_1 : $V = IR \rightarrow A_1 = I \cdot R_p$

or $I = \frac{A_1}{R_p}$ (2)

Combine (1) and (2)

$$\frac{5V}{R_1 + R_p} = \frac{A_1}{R_p} \quad \text{or} \quad \frac{5V}{A_1} = \frac{R_1 + R_p}{R_p} = \frac{R_1}{R_p} + 1$$

or $\frac{5V}{A_1} - 1 = \frac{R_1}{R_p}$

or

$$R_p = \frac{R_1}{\left(\frac{5V}{A_1}\right) - 1}$$

↑
using this equation