

Параллельное соединение резисторов (два резистора)

Дано: $R1 = 130 \text{ Ом}$, $R2 = 270 \text{ Ом}$

$$R_{\text{общ}} = \frac{1}{R1} + \frac{1}{R2} = \frac{1}{130} + \frac{1}{270} = \frac{1}{0.00769 + 0.00370} = \frac{1}{0.01139} = 87.79 \text{ Ом}$$

$$R1 = 1 / \left(\frac{1}{R_{\text{общ}}} - \frac{1}{R2} \right) = 1 / \left(\frac{1}{87.79} - \frac{1}{270} \right) = 1 / (0.01139 - 0.0037) = \frac{1}{0.00769} = 130.039 \text{ Ом}$$

$$R2 = 1 / \left(\frac{1}{R_{\text{общ}}} - \frac{1}{R1} \right) = 1 / \left(\frac{1}{87.79} - \frac{1}{130} \right) = 1 / (0.01139 - 0.00769) = \frac{1}{0.0037} = 270.27 \text{ Ом}$$

Теперь чуть иначе

$$R_{\text{общ}} = \frac{R1 \cdot R2}{R1 + R2} = \frac{130 \cdot 270}{130 + 270} = \frac{35100}{400} = 87.75 \text{ Ом}$$

$$R1 = \frac{R_{\text{общ}} \cdot R2}{R2 - R_{\text{общ}}} = \frac{87.75 \cdot 270}{270 - 87.75} = \frac{23692.5}{182.25} = 130 \text{ Ом}$$

$$R2 = \frac{R_{\text{общ}} \cdot R1}{R1 - R_{\text{общ}}} = \frac{87.75 \cdot 130}{130 - 87.75} = \frac{11407.5}{42.25} = 270 \text{ Ом}$$

Расчёты с погрешностью!

Параллельное соединение резисторов (три резистора)

Дано: $R1 = 130 \text{ Ом}$, $R2 = 270 \text{ Ом}$, $R3 = 105 \text{ Ом}$

$$R_{\text{общ}} = \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3} = \frac{1}{130} + \frac{1}{270} + \frac{1}{105} = \frac{1}{0.00769 + 0.00370 + 0.00952} = \frac{1}{0.02091} = 47.824 \text{ Ом}$$

$$R1 = 1 / \left(\frac{1}{R_{\text{общ}}} - \frac{1}{R2} - \frac{1}{R3} \right) = 1 / \left(\frac{1}{47.824} - \frac{1}{270} - \frac{1}{105} \right) = 1 / (0.0209 - 0.0037 - 0.00952) = \frac{1}{0.00768} = 130.208 \text{ Ом}$$

$$R2 = 1 / \left(\frac{1}{R_{\text{общ}}} - \frac{1}{R1} - \frac{1}{R3} \right) = 1 / \left(\frac{1}{47.824} - \frac{1}{130} - \frac{1}{105} \right) = 1 / (0.0209 - 0.00769 - 0.00952) = \frac{1}{0.00369} = 271 \text{ Ом}$$

$$R3 = 1 / \left(\frac{1}{R_{\text{общ}}} - \frac{1}{R1} - \frac{1}{R2} \right) = 1 / \left(\frac{1}{47.824} - \frac{1}{130} - \frac{1}{270} \right) = 1 / (0.0209 - 0.00769 - 0.0037) = \frac{1}{0.00951} = 105.15 \text{ Ом}$$

Теперь чуть иначе

$$R_{\text{общ}} = \frac{R1 \cdot R2 \cdot R3}{R1 \cdot R3 + R2 \cdot R3 + R1 \cdot R2} = \frac{130 \cdot 270 \cdot 105}{130 \cdot 105 + 270 \cdot 105 + 130 \cdot 270} = \frac{3685500}{13650 + 28350 + 35100} = \frac{3685500}{77100} = 47.801 \text{ Ом}$$