Superposition equatons:

$$\begin{aligned} v_{O2} &= -\frac{R}{R}v_O - \frac{R}{R_G}v_1 + \left(1 + \frac{R}{R\|R_G}\right)v_2 \\ &= -v_O - \frac{R}{R_G}v_1 + \left(1 + 2\frac{R}{R_G}\right)v_2 \end{aligned}$$

$$\begin{aligned} v_1 &= \frac{R\|R_G}{R + R\|R_G}v_{O2} + \frac{R\|R}{R_G + R\|R}v_2 \\ &= \frac{1}{2 + \dfrac{R}{R_G}}\left(v_{O2} + \frac{R}{R_G}v_2\right) \end{aligned}$$

Substitute the v_{O2} equation into the v_1 equation and simplify:

$$\begin{aligned} v_1 &= \frac{1}{2 + \dfrac{R}{R_G}}\left[-v_O - \frac{R}{R_G}v_1 + \left(2 + \frac{R}{R_G}\right)v_2 + \frac{R}{R_G}v_2\right] \\ &= \frac{1}{2 + \dfrac{R}{R_G}}\left[-v_O - \frac{R}{R_G}v_1 + 2\left(1 + \frac{R}{R_G}\right)v_2\right] \end{aligned}$$

Solve for v_O to obtain:

$$v_O = 2\left(1 + \frac{R}{R_G}\right)(v_2 - v_1)$$