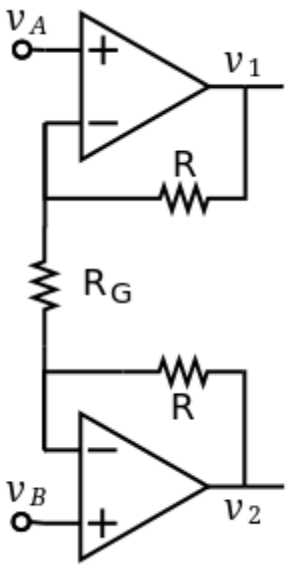

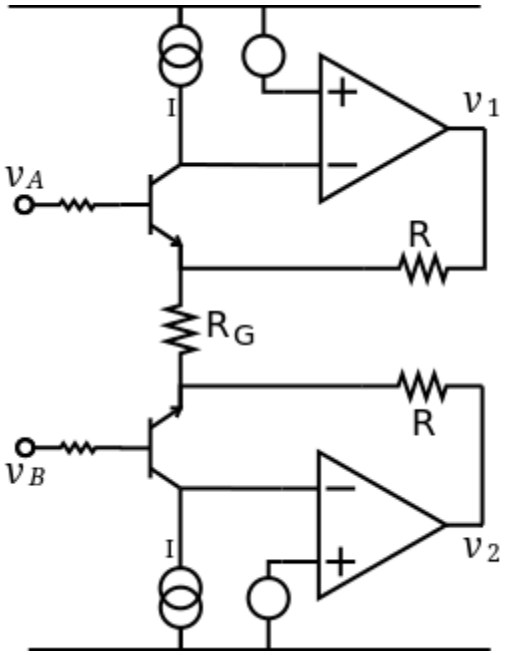

Applying Kirchoff's current law at the emitter nodes of the RHS circuit:

$$I=\frac{v_A-v_{BE}-v_1}{R}+i_G \quad \text{and} \quad I=\frac{v_B-v_{BE}-v_2}{R}-i_G$$

(the small input resistors can be neglected, since the base currents are only ~nA). Subtracting

$$0=(v_B-v_A)-(v_2-v_1)-2\mathrm{R}i_G$$

Meanwhile through R_G

$$i_G=\frac{(v_A-v_{BE})-(v_B-v_{BE})}{R_G}$$

Substituting

$$0=(v_B-v_A)-(v_2-v_1)-\frac{2\mathrm{R}}{R_G}(v_A-v_B)$$

Hence

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

i.e. the gain formula is the same as for the generic instrumentation amp on the LHS however the voltages at the external gain resistor R_G (pins 1 and 8 of the AD620 device) sit at v_{BE} below the input voltages instead of being equal to them.