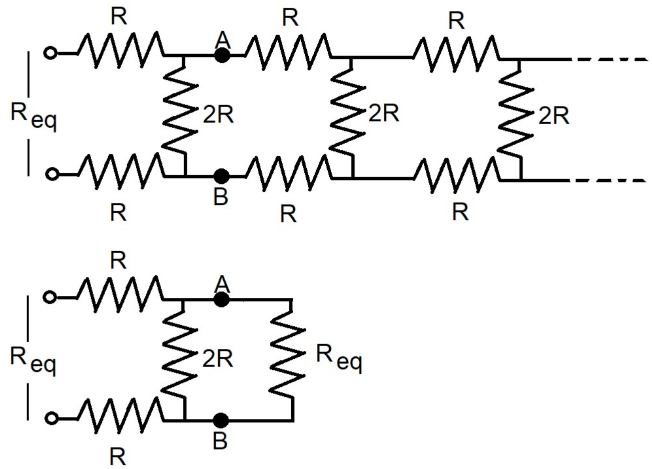
4-6)

The network has an equivalent resistance of R_{eq}. Since the network is infinitely long, it will look the same if we were to consider only the resistors to the right of points A and B so that the resistance from there to the right would also be R_{eq}. Let's replace that part of the chain with a single resistor of value R_{eq}. The network now looks like the lower diagram. Then, the 2R resistor on the R_{eq} on the right are in parallel, with that combination in series with the other two Rs.



$$R_{eq} = R + \left(\frac{1}{2R} + \frac{1}{R_{eq}}\right)^{-1} + R$$

$$R_{eq} = 2R + \frac{2RR_{eq}}{2R + R_{eq}}$$

$$(2R + R_{eq})R_{eq} = 2R(2R + R_{eq}) + \ 2RR_{eq}$$

$$2RR_{eq} + R_{eq}^2 = 4R^2 + 2RR_{eq} + \ 2RR_{eq}$$

$$+R_{eq}^2 - 2RR_{eq} - 4R^2 = 0$$

Solve the quadratic:

$$R_{eq} = \frac{-(-2R) \pm \sqrt{(-2R)^2 - 4(1)(-4R^2)}}{2(1)} = R \pm \sqrt{5}R = 3.24R \quad .$$

The other root gives a negative resistance and so we ignore it.