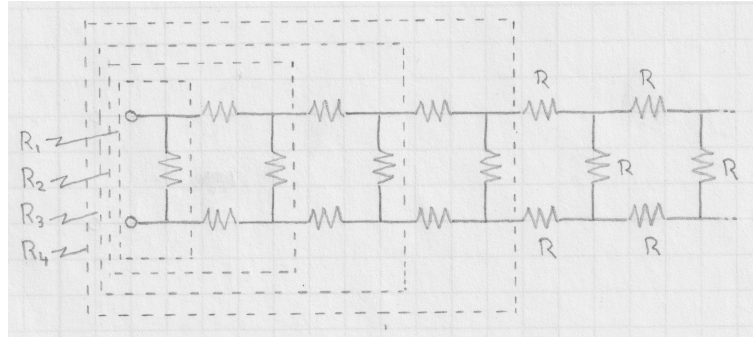


[lex49] Resistor circuit II

The resistor circuits inside the dashed boxes contain $3n - 2$ resistors of resistance R and have an equivalent resistance R_n .

- (a) Determine the equivalent resistances R_1, \dots, R_4 as fractions of R .
- (b) Establish a recurrence relation that expresses R_n as a function of R_{n-1} and R .
- (c) It can be reasoned that for large n the difference between R_n and R_{n-1} becomes negligible. Use this assumption to convert the recurrence relation into an equation for R_∞ , the equivalent resistance of an infinite array. Express R_∞ as a fraction of R .
- (d) Check the convergence of R_n by evaluating the ratios R_n/R_∞ for $n = 1, \dots, 4$.



Solution: