Solution 6-3

This is an example solution from the forthcoming book Networks and Complexity.
Find more exercises at https://github.com/NC-Book/NCB

Ex 6.3: Norm [2]

We now consider the two distributions from Ex. 6.1 (a) and (b) as degree distributions of networks. Show that these distributions are correctly normalized, i.e. $\sum p_k = 1$.

Solution

From Ex. 6.1 we already know that the distribution for (a) can be written as

$$p_k = \frac{3}{4}\delta_{k,4} + \frac{1}{4}\delta_{k,8}. \tag{1}$$

We now compute

$$\sum p_k = \sum \left(\frac{3}{4}\delta_{k,4} + \frac{1}{4}\delta_{k,8} \right) = \frac{3}{4} + \frac{1}{4} = 1, \tag{2}$$

which shows that the distribution is correctly normalized.

Similarly for case (b) we compute

$$\sum p_k = \sum \left(\frac{1}{3}\delta_{k,3} + \frac{1}{3}\delta_{k,4} + \frac{1}{3}\delta_{k,14} \right) = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1. \tag{3}$$