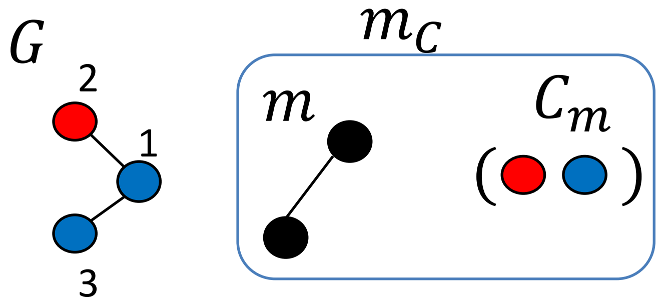
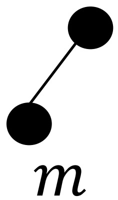
Figure 5. **Probability computation for the Multiset Topological Colored Motif under the EDD random model.** **(a)** Input graph G, input motif m_C, d_x is the degree of node x, m_u+=1 for both nodes of the motif, the Deg distribution assumes values within the set {1,2}, $P(Deg = 1) = \frac{2}{3}, P(Deg = 2) = \frac{1}{3}, \mathbb{E}(Deg) = \frac{4}{3}$. **(b)** Probability of the motif. i) Probability of the topology: generate the set I_2 all the a vectors storing the node degrees pairs within the graph. The probability of the topology is given as the sum of all probabilities of each occurrence times the probability of observing such node degrees. This can be expressed as a product of Moments (Expectations in this case); ii) Probability of the multiset of colors based on the multinomial distribution; iii) The probability of the motif is obtained as the product of the probabilities i) and ii).



(a)

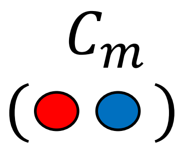
i)



I_2={(1,2),(2,1),(1,1),(2,2)}

$$\mu(m) = \sum_{(d_i,d_j)\in I_2} P(d_i)P(d_j)\frac{d_i d_j}{\lambda} = \frac{1}{\lambda}\prod_{u=1}^{2}\mathbb{E}(Deg^{m_u+}) = \frac{4}{9}$$

ii)



$$\gamma(C) = \frac{2!}{1!\,1!}\times\frac{1}{3}\times\frac{2}{3} = \frac{4}{9}$$

iii)

$$\sigma(m_C) = \gamma(C)\times\mu(m) = \frac{4}{9}*\frac{4}{9}$$

(b)