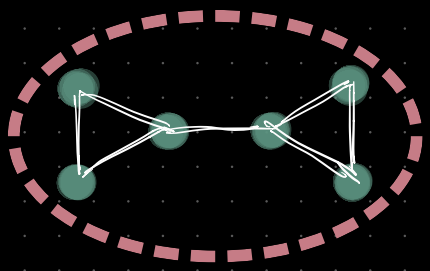
$$Q = \sum_{x=1}^{NM} \left[\frac{I_s}{L} - \left(\frac{d_s}{2L} \right)^2 \right]$$

NM = number of modules in the network.

I_s = number of intra-modular links in module s.

d_s = sum of the degrees of the nodes in module s.

L = total number of links in the network.



$Q = 0$.

$N_M = 1$

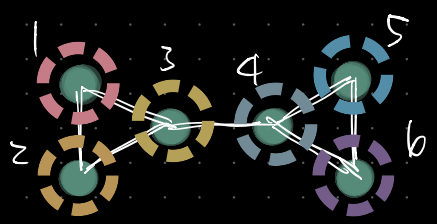
$I_1 = 7$

$M_1 = 14$

$L = 7$

$$\frac{7}{7} - \left(\frac{14}{14}\right)^2$$

$$= 1 - 1 = 0 \quad \#$$



$Q = -0.1735$.

$NM = 7$

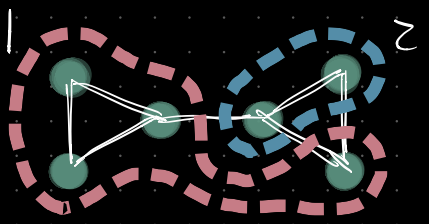
$I_1 = 0,\ I_2 = 0,\ I_3 = 0,\ I_4 = 0,\ I_5 = 0,\ I_6 = 0$

$d_1 = 2,\ d_2 = 2,\ d_3 = 3,\ d_4 = 3,\ d_5 = 2,\ d_6 = 2.$

$L = 7$

$$\left[\frac{0}{7}-\left(\frac{2}{14}\right)^2\right]+\left[\frac{0}{7}-\left(\frac{2}{14}\right)^2\right]+\left[\frac{0}{7}-\left(\frac{3}{14}\right)^2\right]$$
$$+\left[\frac{0}{7}-\left(\frac{3}{14}\right)^2\right]+\left[\frac{0}{7}-\left(\frac{2}{14}\right)^2\right]+\left[\frac{0}{7}-\left(\frac{2}{14}\right)^2\right]$$

$$= -\frac{1}{49}+\left(-\frac{1}{49}\right)+\left(-\frac{9}{196}\right)+\left(-\frac{9}{196}\right)$$
$$+\left(-\frac{1}{49}\right)+\left(-\frac{1}{49}\right) = -\frac{4}{49}+\left(-\frac{18}{196}\right)$$
$$= -\frac{4\times 4+18}{196} = -\frac{34}{196} = -\frac{17}{98} = -0.1735$$



$Q = 0.0306$.

$N_M = 2$

$I_1 = 3,\ I_2 = 1$

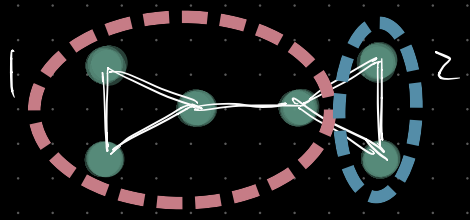
$\alpha_1 = 9,\ \alpha_2 = 5$

$L = 7$

$$\left[\frac{3}{7} - \left(\frac{9}{14}\right)^2\right] + \left[\frac{1}{7} - \left(\frac{5}{14}\right)^2\right]$$

$$= \frac{3\times 28 - 81}{196} + \frac{1\times 28 - 25}{196} = \frac{3+3}{196}$$

$$= \frac{6}{196} = \frac{3}{98} = 0.0306 \ \#$$



$Q = 0.1224$

$NM = 2$

$I_1 = 4, \quad I_2 = 1$

$\alpha_1 = 10, \quad \alpha_2 = 4$

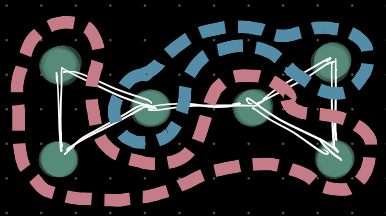
$L = 7$

$$\left[\frac{4}{7} - \left(\frac{10}{14}\right)^2\right] + \left[\frac{1}{7} - \left(\frac{4}{14}\right)^2\right]$$

$$= \frac{4 \times 28 - 100}{196} + \frac{1 \times 28 - 16}{196}$$

$$= \frac{12 + 12}{196} = \frac{24}{196} = 0.1224$$

1



2

$Q = -0.2551.$

$N_M = 2$

$I_1 = 2, \; I_2 = 0$

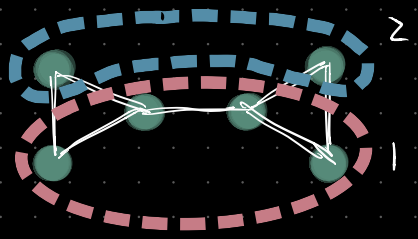
$\alpha_1 = 9, \; \alpha_2 = 5$

$L = 7$

$$\left[\frac{2}{7} - \left(\frac{9}{14}\right)^2\right] + \left[\frac{0}{7} - \left(\frac{5}{14}\right)^2\right]$$

$$= \frac{2 \times 28 - 81}{196} + \frac{0 - 25}{196} = \frac{-25 - 25}{196}$$

$$= \frac{-50}{196} = -0.2551$$



$Q = -0.1633$.

$N_M = 2$

$I_1 = 3,\ I_2 = 0$

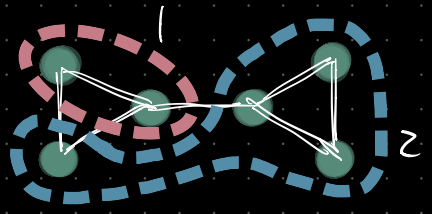
$\alpha_1 = 10,\ \alpha_2 = 4$

$L = 7$

$$\left[\frac{3}{7} - \left(\frac{10}{14}\right)^2\right] + \left[\frac{0}{7} - \left(\frac{4}{14}\right)^2\right]$$

$$= \frac{3\times 28 - 100}{196} + \frac{0 - 16}{196} = \frac{-16-16}{196}$$

$$= \frac{-32}{196} = -0.1633$$



$Q = 0.0306$.

$N_M = 2$

$I_1 = 1,\ I_2 = 3$

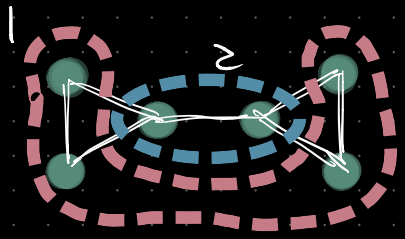
$\alpha_1 = 5,\ \alpha_2 = 9$

$L = 7$

$$\left[\frac{1}{7} - \left(\frac{5}{14}\right)^2\right] + \left[\frac{3}{7} - \left(\frac{9}{14}\right)^2\right]$$

$$= \frac{1\times 28 - 25}{196} + \frac{3\times 28 - 81}{196} = \frac{3+3}{196}$$

$$= \frac{6}{196} = 0.0306$$



$Q = -0,0816.$

$N_M = 2$

$I_1 = 2,\ I_2 = 1$

$\alpha_1 = 8,\ \alpha_2 = 6$

$L = 7$

$$\left[\frac{2}{7} - \left(\frac{8}{14}\right)^2\right] + \left[\frac{1}{7} - \left(\frac{6}{14}\right)^2\right]$$

$$= \frac{2\times 28 - 64}{196} + \frac{1\times 28 - 36}{196} = \frac{-8-8}{196}$$

$$= \frac{-16}{196} = -0,0816$$