Lecture Introduction to Network Science
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BIONETS

SOLUTION 10

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Question 1

a) Unlabelled nodes are assigned labels together; correlations exist in network

b) synchronous; asynchronous

c) Also integrates node features

Question 2

a) The transition probability matrix is given by

$$T = \frac{1}{3} \begin{pmatrix} 0 & 1 & 1 & 1 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 3 \end{pmatrix}.$$

The initial class probability matrix is given by

$$Y^{(0)} = \frac{1}{2} \begin{pmatrix} 1 & 1 \\ 2 & 0 \\ 1 & 1 \\ 1 & 1 \\ 0 & 2 \end{pmatrix}.$$

b) The update class probability matrix after one iteration reads

$$Y^{(1)} = \frac{1}{6} \begin{pmatrix} 4 & 2 \\ 6 & 0 \\ 4 & 2 \\ 2 & 4 \\ 0 & 6 \end{pmatrix}.$$

Question 3

See exemplary implementation in `correct_smooth.ipynb`.