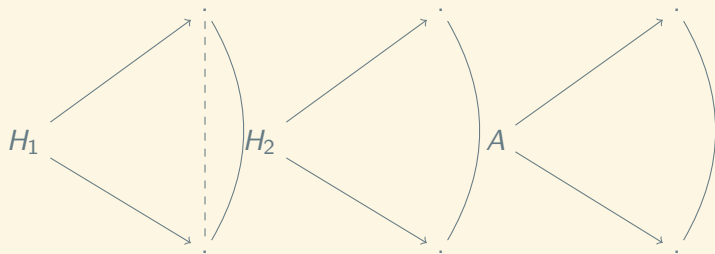


Annual Review

Michalis Panayides

2020-06-10

PhD - Motivation



PhD - Motivation

NHS Wales: A&E record low performance as ambulance service struggles

By Owain Clarke
BBC Wales health correspondent

19 December 2019

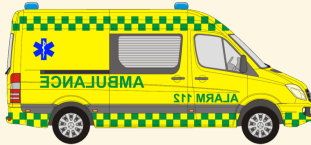
[f](#) [b](#) [t](#) [e](#) [Share](#)



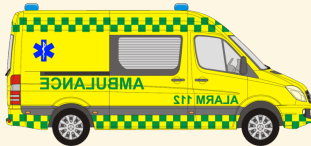
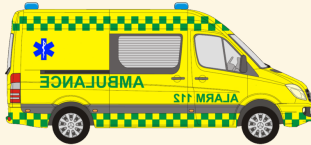
Ambulances outside Morriston Hospital in Swansea this week



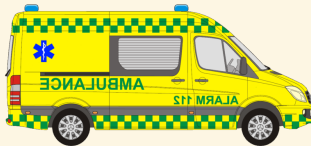
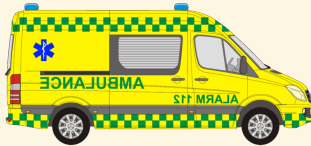
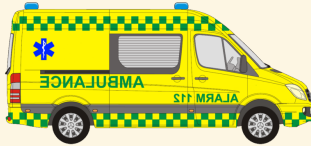
PhD - Motivation



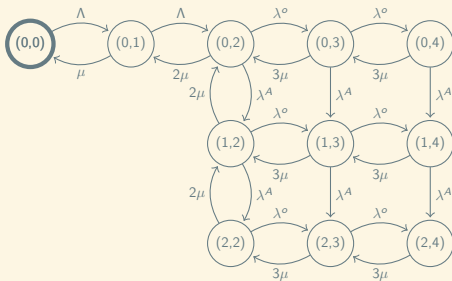
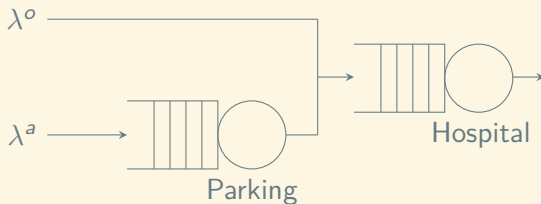
PhD - Motivation



PhD - Motivation

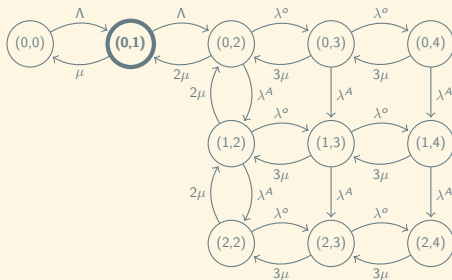
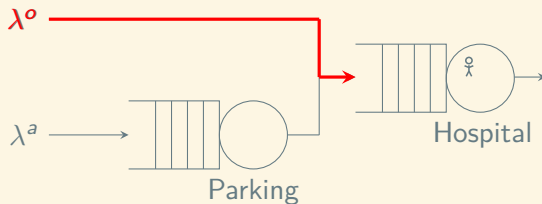


Hospital Formulation



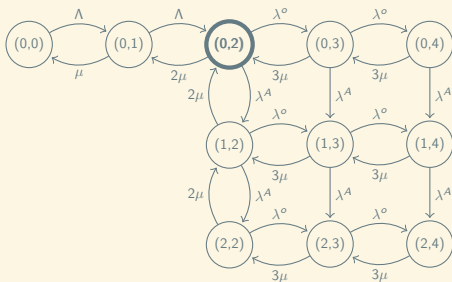
$$C=3, T=2, N=4, M=2$$

Hospital Formulation



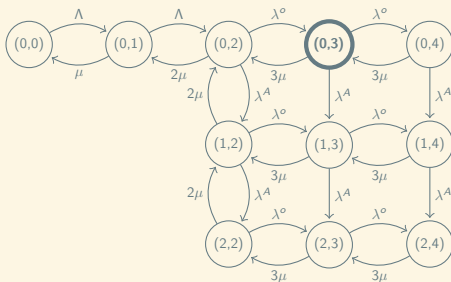
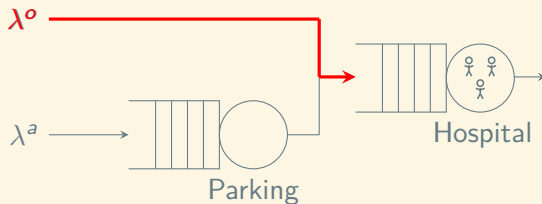
$$C=3, T=2, N=4, M=2$$

The diagram illustrates a queueing system with two arrival streams and two service stages. The first stage is labeled "Parking" and consists of a queue (represented by four vertical bars) and a circular service node. The second stage is labeled "Hospital" and also consists of a queue (represented by four vertical bars) and a circular service node containing two stick figures. An arrival stream λ^o enters from the top left and flows into the "Hospital" queue. Another arrival stream λ^a enters from the bottom left and flows into the "Parking" queue. A blue arrow indicates a flow from the "Parking" service node to the "Hospital" queue, representing a transition or referral between the two stages.



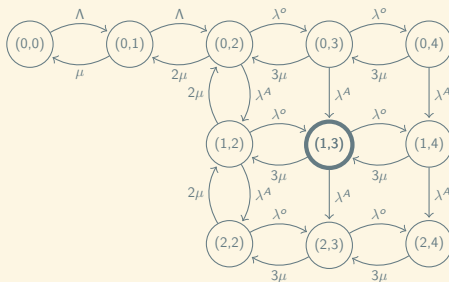
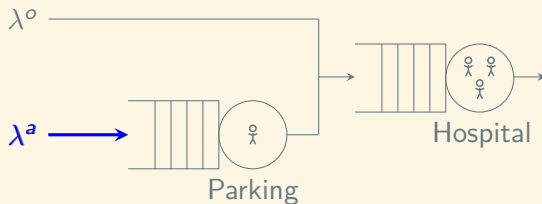
$C=3, T=2, N=4, M=2$

Hospital Formulation



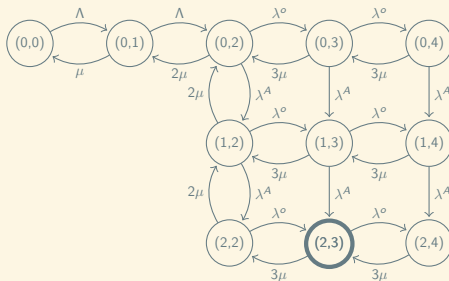
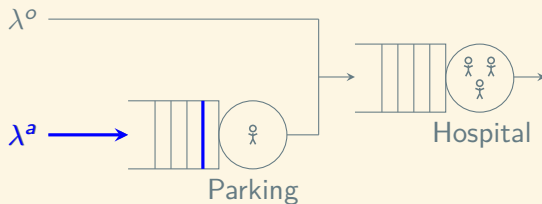
$$C=3, T=2, N=4, M=2$$

Hospital Formulation



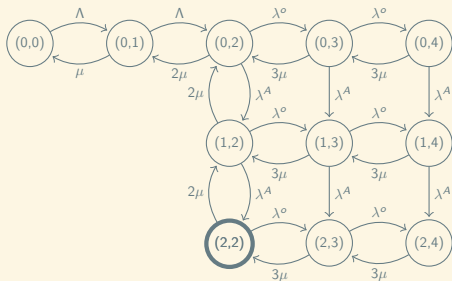
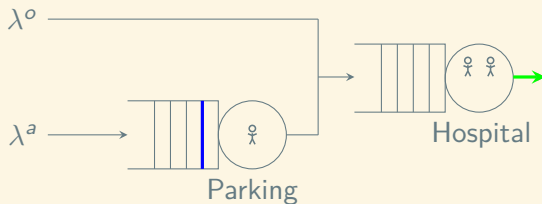
$$C=3, T=2, N=4, M=2$$

Hospital Formulation



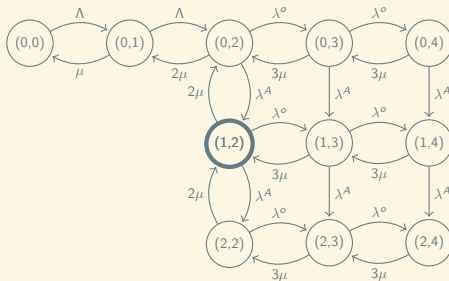
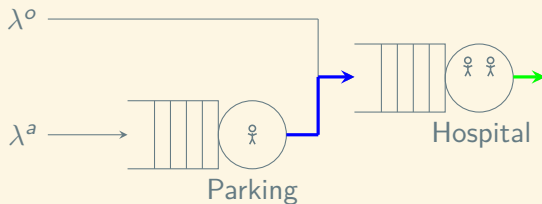
$$C=3, T=2, N=4, M=2$$

Hospital Formulation



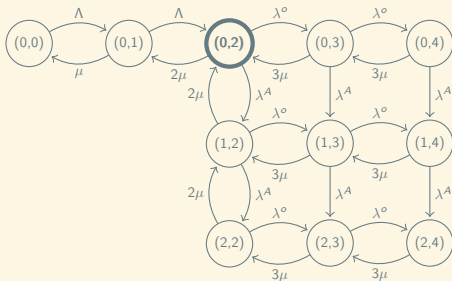
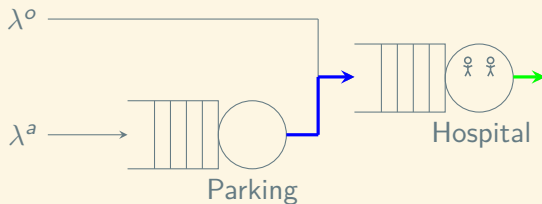
$$C=3, T=2, N=4, M=2$$

Hospital Formulation



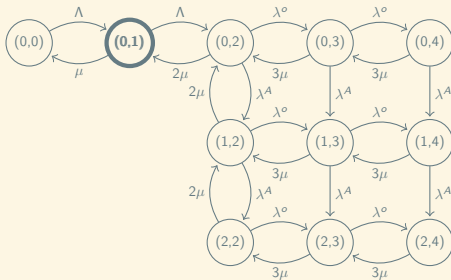
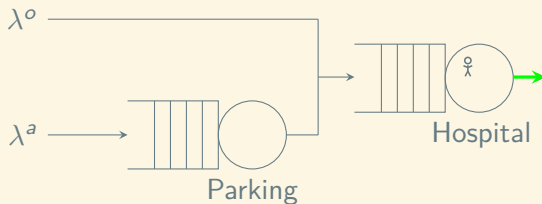
$$C=3, T=2, N=4, M=2$$

Hospital Formulation



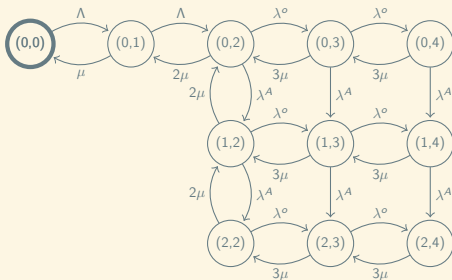
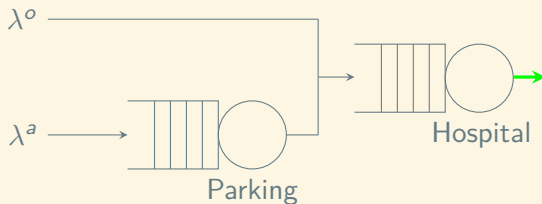
$$C=3, T=2, N=4, M=2$$

Hospital Formulation



$$C=3, T=2, N=4, M=2$$

Hospital Formulation



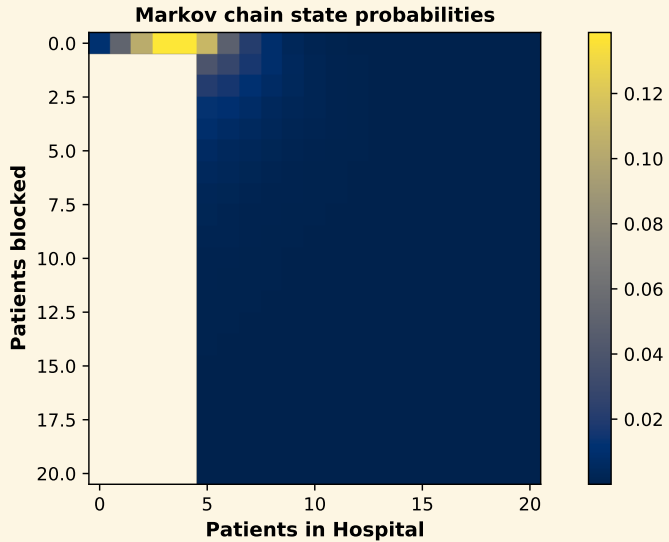
$$C=3, T=2, N=4, M=2$$

State Probabilities

$$\pi Q = 0$$

$$\sum_i \pi_i = 1$$

State Probabilities

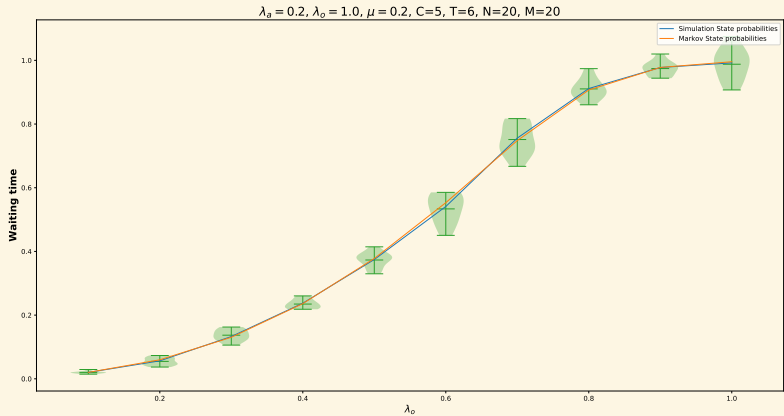


Waiting Times

$$W = \frac{\sum_{(u,v) \in S_A} w(u,v) \pi(u,v)}{\sum_{(u,v) \in S_A} \pi(u,v)}$$

$$W = \frac{\lambda_o P(L'_o)}{\lambda_a P(L'_a) + \lambda_o P(L'_o)} W^{(o)} + \frac{\lambda_a P(L'_a)}{\lambda_a P(L'_a) + \lambda_o P(L'_o)} W^{(a)}$$

Waiting Times

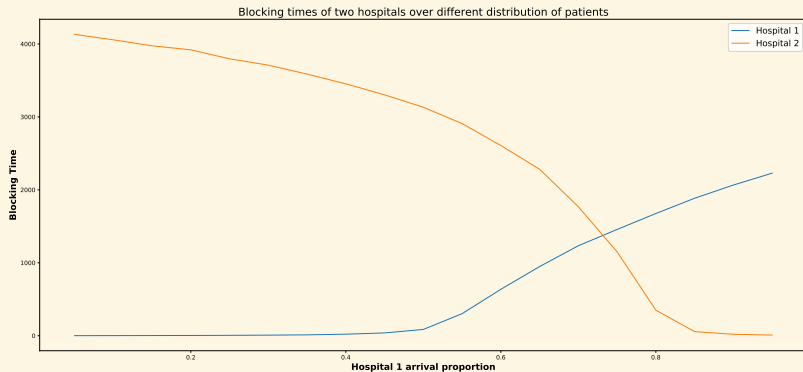


Future Plans

$$A = \begin{array}{|c|c|c|c|} \hline U_{1,1}^A & U_{1,2}^A & \cdots & U_{1,C_2}^A \\ \hline U_{2,1}^A & U_{2,2}^A & \cdots & U_{2,C_2}^A \\ \hline \vdots & \vdots & \ddots & \vdots \\ \hline U_{C_1,1}^A & U_{C_1,2}^A & \cdots & U_{C_1,C_2}^A \\ \hline \end{array}$$

$$B = \begin{array}{|c|c|c|c|} \hline U_{1,1}^B & U_{1,2}^B & \cdots & U_{1,C_2}^B \\ \hline U_{2,1}^B & U_{2,2}^B & \cdots & U_{2,C_2}^B \\ \hline \vdots & \vdots & \ddots & \vdots \\ \hline U_{C_1,1}^B & U_{C_1,2}^B & \cdots & U_{C_1,C_2}^B \\ \hline \end{array}$$

Future Plans



$$B_1 = B_2$$

Future Plans

