Errata in Chapter 2

Page 48, after solution to problem 6

(changes marked in RED).

A word of caution is that when the cut set A is separated from the state space S, all the arcs going from A to $S - A$ must be considered. A good way to make sure of that is to clearly identify the cut set A as opposed to just performing a cut arbitrarily. Care must be taken to ensure that the arc cuts result in linearly independent equations. One way to do that is to account for all the arcs in various cuts. When in doubt, use node cut. Next we use the arc-cut method to obtain steady-state distributions of the number in the system for a specific class of queueing systems.

Page 76, Solution to problem 15

(changes marked in RED).

Note that since $\psi(z)$ is $p_0 + p_1 z + p_2 z^2 + p_3 z^3 + p_4 z^4 + \ldots$, it is a continuous, differentiable, bounded and increasing function over $z \in [0, 1]$. However from Equation (**??**), $\psi(z)$ is of the form $\phi(z) = \frac{A(z)}{B(z)}$, where $A(z)$ and $B(z)$ are polynomials corresponding to the numerator and denominator of the equation. If there exists a $z^* \in (0, 1)$ such that $B(z^*) = 0$, then $A(z^*) = 0$ (otherwise it violates the condition that $\psi(z)$ is a bounded and increasing function over $z \in (0, 1)$). We now use the above realization to derive a closed-form algebraic expression for $\psi(z)$.

Page 88, Execises problem 2.12

(changes marked in RED).

Consider two infinite-capacity queueing systems: system 1 has s servers, each serving at rate μ; system 2 has a single server, serving at rate $s\mu$. Both systems are subject to $PP(\lambda)$ arrivals and exponentially distributed service times. Show that in steady state, assuming the systems are stable, the expected number of customers in system 2 is less than that in system 1. Do the same analysis for the expected number of customers in the queue L_q. Which system is better?