Errata for [1]

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1 Eq 8 and 9 Error

Note that Equations 8 and 9 are never used in any results; because they are numerically unstable, Equation 10 is used instead. However, equations 8 and 9 are wrong as stated. The correct equations are:

$$p(b|m) = \frac{\binom{S-1}{m}\rho^m}{\sum_{i=0}^{m}\binom{S-1}{i}\rho^i}, \quad \rho = \frac{1/\mu}{1/\lambda_B} \tag{$\hat{8}$}$$

$$= \frac{\binom{S-1}{m}\psi^m(1-\psi)^{S-m}}{\sum_{i=0}^{m}\binom{S-1}{i}\psi^i(1-\psi)^{S-i}}, \quad \psi = \frac{\rho}{1+\rho} \tag{$\hat{9}$}$$

Eq($\hat{8}$), Eq($\hat{9}$), and the original version of Eq(10) in [1] are all equivalent (modulo the numerical instability of Eq($\hat{8}$), Eq($\hat{9}$)), as shown numerically [2].

2 Footnote 2 is not needed

The first paragraph of section 3.C is confusing. In footnote 2, we stated that there was no way to measure each subscribers' busy period MTT and then compute a weighted average of them, as the same user may not arrive and depart multiple times within the same busy period. But we don't need to; the above logic is the wrong way to think about this problem. The correct thinking is to calculate the arrival rate as seen by the pool during busy periods, then simply solve for the busy period MTT (which we did).

Thus, the methodology is correct, but the reasoning is confusing. Given this, the first paragraph section 3.C should simply say:

In this approach, the input to the sizing algorithm is a trace of past requests to an existing pool that contains 1) the times at which each request is made, and 2) the duration of each request. This dataset allows us to obtain a more accurate sizing than ELM_S because fewer approximations are made—we can now directly measure A_B as well as $1/\mu$, and subsequently solve for $1/\lambda_B$.

References

[1] T. Carpenter, S. Keshav, and J. Wong, "Sizing finite-population vehicle pools," *IEEE Transactions on Intelligent Transportation Systems*, vol. PP, no. 99, pp. 1–11, 2014.
[2] https://github.com/tommyjcarpenter/queueing-models.