MKTG/STAT 4760/7760
Spring 2026

Homework #1

Due Wednesday 1/28, 3:30PM

1. Look carefully at slide 18 (confusingly labeled as 19) from the Session 1 deck, which compares the survival curves for the actual data and the homogeneous shifted geometric model. Explain the major/systematic differences between the two curves. (Hint: think about why the sBG model tracks the actual data so well.)

2. Run the sBG model and produce forecasts for both datasets ("High End" and "Regular") in two different ways: using the seven-period calibration period we used in class as well as a ten-period one. Briefly describe your results and any key conclusions that you draw from them.

3. For an sBG timing process with parameters $(\alpha, \beta) = (1, 2)$, what is the expected "half life" of a cohort of newly acquired customers (i.e., how many renewal cycles should we expect to wait until 50% of the customers have churned)?

4. Derive the "unshifted" beta-geometric model and its key characteristics: $P(t|\alpha,\beta)$, $S(t|\alpha,\beta)$, and the formulas needed to compute $P(t|\alpha,\beta)$ via forward recursion.

Students are allowed to collaborate when it comes to discussing these HW problems, but not on the write-up itself. You must do your own work to convey your answers (which is the only way you're going to really learn this stuff).

All homework must be uploaded to Gradescope (via Canvas); email submissions will not be accepted.