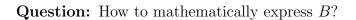
1 Review of Busy Periods

Question: What is a busy period, B?

Question: What is the mean length of the M/G/1 busy period, $\mathbf{E}[B]$ (recall homework)?

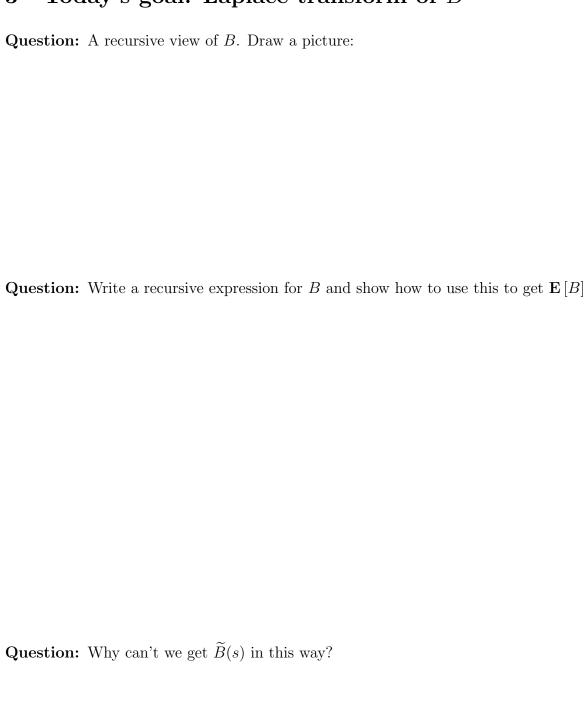
Question: What does $\mathbf{E}[B]$ look like when ρ is low? How about when ρ is high?

2 Today's goal: Laplace transform of B



Question: Is there a simpler expression? Does the length of a busy period depend on scheduling policies?

3 Today's goal: Laplace transform of B



4 A new approach to get Laplace transform of B

B =duration of a busy period, made up of jobs with size distribution S.

B(x) = duration of a busy period started by a job of size x. All other jobs have size $\sim S$.

- STEP 1: First derive the Laplace transform of B(x).
- STEP 2: Express the Laplace transform of B in terms of the transform of B(x) by conditioning on the size of the first job in the busy period.

STEP 1: Derive Laplace transform of B(x)

STEP 2: Derive Laplace transform of B

5	Der	ive	the	mom	ents	of	B	from	its	trans	form
Que	stion:	What	t about	t the dist	tributio	n of A	B?				

6 Busy period started by x

Question: Consider B(x), the duration of a busy period started by a job of size x. What is $\mathbf{E}[B(x)]$? Differentiate the transform to check.

7 Busy period started by W

 $B_W = \text{length of a busy period started by a job of size } W, \text{ where all other jobs have size } \sim S.$

Question: What is $\mathbf{E}[B_W]$?

Question: What is the Laplace transform of B_W ?

Question: Differentiate the transform to check that you get $\mathbf{E}[B_W]$