ASEN 6519-007 Quiz 0: Background Assessment

January 13, 2020

This is a short survey quiz to gauge your background and interests for the course. The quiz is not graded; the purpose is to gauge initial understanding, and we will review the concepts in class if they seem rusty. Don't spend more than a half hour on this.

1. What other courses related to probability and estimation have you taken? Which other controls or robotics, machine learning, or other related courses?

2. What programming languages are you familiar with? Rate your familiarity on a scale of 1 (have read about) to 5 (have used daily for years)

3. In general terms, what do you hope to learn from taking this course? Is there any specific topic you would like to see covered in this course?

4. What is a random variable?

5. In your own words, explain what a probability density function is (pdf)? Is it possible for the cumulative density function (cdf) to exist, but not have a finite pdf? Explain.

6. Consider the following joint distribution of three binary-valued random variables, A, B, and C:

    1. What is the marginal distribution of A?

A	B	C	$P(A, B, C)$
0	0	0	0.08
0	0	1	0.15
0	1	0	0.05
0	1	1	0.10
1	0	0	0.14
1	0	1	0.18
1	1	0	0.19
1	1	1	0.11

    2. What is the conditional distribution of A given $B = 1$ and $C = 1$?

    3. 1% of women at age forty who participate in routine screening have breast cancer. 80% of women with breast cancer will get positive mammographies. 9.6% of women without breast cancer will also get positive mammographies. A woman in this age group had a positive mammography in a routine screening. What is the probability that she actually has breast cancer?