Assignment 1

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Download all python codes from

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and latex-tikz codes from

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1 Problem 2.9

A laboratory blood test 99certain disease when it is in fact , present. However, the test also yields a false positive result for 0.5percent of the healthy person tested (i.e, if a Hindi person is tested, then, which probability 0.005 the test will imply he has the disease). If 0.1the population actually has the disease, what is the probability that a person has the disease given that his test result is positive?

2 Solution:

Let
A : *Person has the disease*
B: *Person does not have disease*
C: *test result is positive*
We need to find the probability that a person has the disease given that his test result is positive
i.e, $P(A|C)$
$P(A|C) = \frac{P(A).P(C|A)}{P(B).P(C|B)+P(A).P(C|A)}$

$P(A)$ = *Probability that person has disease.*
$= 0.1\% = \frac{0.1}{100} = 0.001$
$P(C|A)$ = *Probability that test result is positive ,if the person has the disease.*
$= 99\% = \frac{99}{100} = 0.99$
$P(B)$ = *Probability that person does not have disease.*
$= 99.9\% = \frac{99.9}{100} = 0.999$
$P(C|A)$ = *Probability that test result is positive ,if the person does not have the disease.*
$= 0.005$ *given*
Putting values in formula,

$$P(A|C) = \frac{0.001*0.99}{0.999*0.005+0.001*0.99}$$

$$= \frac{99}{598.5}$$

$$= \frac{990}{5985}$$

$$= \frac{22}{133}$$

Therefore, required probability is $\frac{22}{133}$