Hw4 - Beimnet Taye

2023-02-20

P1

1

- They are identical

2

- B: They are identically distributed and independent. C: They are identically distributed not enough evidence to say if they are independent or not

3

-

4

-

P2

1

- Random Variable: Let F_C be a random variable that takes an individual and assess whether they are infected with covid or not.
- Domain: $f_C^{-1} = \{individual\}$
- Range: $F_C(individual) = \{I = infected, H = Healthy\}$
- Random Variable: Let F_t be a random variable that takes an individual and assess whether they have tested positive or negative.
- Domain: $f_t^{-1} = \{individual\}$
- Range: $F_t(individual) = \{+ = positive, - = negative\}$
- $P(t = +) = 0.02$, $P(C = I \cap t = +) = 0.01$
- $P(t = +)$ is a marginal probability and $P(C = I \cap t = +) = 0.01$ is a joint probability

```
pp <- 0.02
ppi <- 0.01
```

2

- $P(C = I|t = +) = \frac{P(C=I,t=+)}{P(t=+)}$

```
pigp <- ppi/pp
pigp
```

```
## [1] 0.5
```

3

- $P(t = +|C = I) = 0.9$
- $P(C = I) = 0.009$

```
ppgi <- 0.9
pi <- 0.009
```

4

$P(I|+) = \frac{P(I)*P(+|I)}{P(+)}$

```
pigp <- (pi*ppgi)/pp
pigp
```

```
## [1] 0.405
```