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MATH 203- SECOND WEEKL QUIZ

Question 1: What kind of information do we get from covariance? Give two real-life examples of r.v.'s where we have a positive and negative values for covariance.

Solution 1: Covariance gives us the degree of correlation between multiple variables. If it is positive, then there is a positive correlation between variables. If it is negative, this means there is negative correlation. so, variables are inversely related. If it is zero, then variables are not correlated.

Example: Positive correlation → number of internships that you do during university education vs salary that you will receive from your first job

Negative correlation → duration of curfew vs number of infected people from coronavirus per day

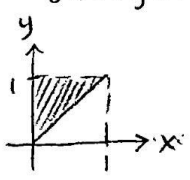
Question 2: Let X and Y are two continuous r.v.'s, H's joint pdf is given as:

$$f(x,y) = \begin{cases} 2, & 0<x<y<1 \\ 0, & \text{elsewhere} \end{cases}$$

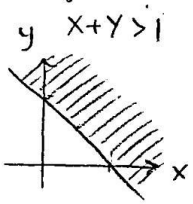
Calculate $P(X+Y>1) = ?$

Solution 2:

Condition from joint pdf $0<x<y<1$



Condition from probability definition $X+Y>1$



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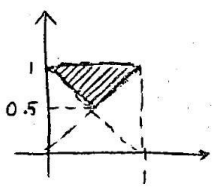
Note: Equality is not important for cont. r.v.. So, I drew it like $X+Y \geq 1$

→ Intersection



Using horizontal lines:

$$\int_{0.5}^{1} \int_{1-y}^{y} 2\,dx\,dy = \frac{1}{2} \quad //$$