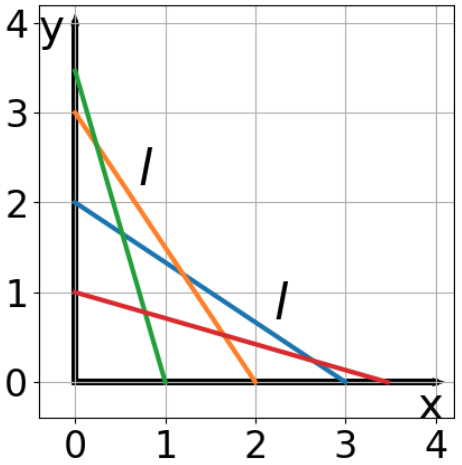
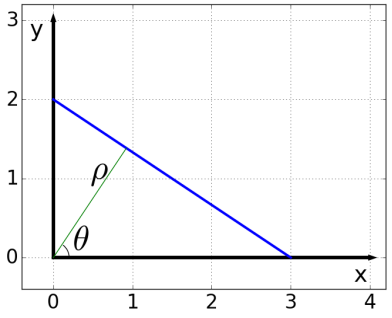
Fundamentals of Computer Vision - Spring 2021 Midterm Exam	B. Nasihatkon	دانشگاه صنعتی خواجه نصیرالدین طوسی K. N. TOOSI UNIVERSITY OF TECHNOLOGY

Question 3- Hough Transform

Consider all lines that cut off the first quadrant (x,y>=0) such that the length of the line segment between the x-intercept and y-intercept equals l.





A) What is the geometric locus of such lines in the hough space? Derive an equation in the form of $\rho = f(\theta)$for $0 \leq \theta \leq \pi/2$. Assume that the lines are parameterized with an angle$\theta$of the line normal and a distance ρ from the origin:

$$x\,cos(\theta) + y\,sin(\theta) = \rho$$

B) Draw the curve for $l = 2$over $0 \leq \theta \leq \pi/2$.Mark the minimum and maximum values plus the zero-crossings.