Assignment 3

Ex 1

a) $I_y(x,y) = \frac{\delta}{\delta y}\left[g(x) \cdot g(y) \cdot I(x,y)\right]$

$= g(x)\left[\frac{d}{dy} g(y) \cdot I(x,y)\right]$

$I_{yy}(x,y) = \frac{\delta}{\delta y}\left[g(x) \cdot g(y) \cdot I_y(x,y)\right]$

$= g(x)\left[\frac{d}{dy} g(y) \cdot I_y(x,y)\right]$

$I_{xy}(x,y) = \frac{\delta}{\delta y}\left[I_x(x,y)\right]$

$= \frac{\delta}{\delta y}\left[\frac{d}{dx} g(x) \cdot g(y) \cdot I(x,y)\right]$

$= \frac{d}{dx} g(x) \cdot \left[\frac{d}{dy} g(y) \cdot I(x,y)\right]$

b) $P_1(0,0)$, $P_2(1,1)$, $P_3(1,0)$, $P_4(2,2)$

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

- $P_1 - P_2$
  $y = x \quad \left(k = \frac{1-0}{1-0}\right)$
  $\rho = 0, \ \theta = \frac{\pi}{4}$

- $P_1 - P_3$
  $y = 0$
  $\rho = 0, \ \theta = \frac{\pi}{2}$

- $P_1 - P_4$
  $y = x$
  $\rho = 0, \ \theta = \frac{\pi}{4}$

- $P_2 - P_3$
  $y = 1$
  $\rho = 1, \ \theta = 0$

- $P_2 - P_4$
  $y = x$
  $\rho = 0, \ \theta = \frac{\pi}{4}$

- $P_3 - P_4$
  $y = 2x - 2$

$2x - y - 2 = 0 \Rightarrow A = 2, B = -1, C = -2$

$\|n\| = \sqrt{A^2 + B^2} = \sqrt{5}$

$\cos\theta = \frac{A}{\|n\|} = \frac{2}{\sqrt{5}}$, $\sin\theta = \frac{B}{\|n\|} = \frac{-1}{\sqrt{5}}$

$\theta = \arctan\left(-\frac{1}{2}\right) = -0.46$ rad

$\rho = -\frac{C}{\sqrt{5}} = \frac{2}{\sqrt{5}}$

Odg:

$$\left.\begin{array}{l} 1.\ P_1 \to P_2 \to P_4 \\ 2.\ P_1 \to P_3 \\ 3.\ P_2 \to P_3 \\ 4.\ P_3 \to P_4 \end{array}\right\} \text{so kolinearne}$$