

Seminar 10

1. Cercetati existenta limitelor de functii

a) $\lim_{(x,y) \rightarrow (0,0)} \frac{xy}{\sqrt{1+xy}-1}$

b) $\lim_{(x,y) \rightarrow (0,2)} \frac{\sin(xy)}{x}$

c) $\lim_{(x,y) \rightarrow (1,1)} \frac{(x-1)(y-1)}{xy-1}$

d) $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2-y^2}{x^2+y^2}$

e) $\lim_{(x,y) \rightarrow (0,0)} \frac{x \sin(x^2-y^2)}{x^2+y^2}$

f) $\lim_{(x,y) \rightarrow (0,0)} \frac{x^3+y^3}{xy}$

g) $\lim_{(x,y) \rightarrow (0,0)} (x^2 + y^2)x^2y^2$

h) $\lim_{(x,y,z) \rightarrow (0,0,0)} \frac{x+y+z}{x^2+y^2+z^2}$

i) $\lim_{(x_1, \dots, x_m) \rightarrow 0_m} \frac{x_1 \cdot \dots \cdot x_m}{(x_1)^2 + \dots + (x_m)^2} \quad m \in \mathbb{N}^*$

2. Studiati continuitatea in origine a functiei $f : [0, \infty) \times [0, \infty) \rightarrow \mathbb{R}$,

$$f(x, y) = \begin{cases} (1 + xy)^{\frac{1}{\sqrt{x} + \sqrt{y}}} & , (x, y) \neq (0, 0) \\ 1 & , (x, y) = (0, 0) \end{cases}$$