University of Toronto Scarborough Campus
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Problems

Q1. Compute the following limits if they exist:

(a) $\lim\limits_{(x,y)\to(0,0)} \dfrac{e^{xy}}{x+1}$

(b) $\lim\limits_{(x,y)\to(0,0)} \dfrac{\cos x - 1 - (x^2/2)}{x^4+y^4}$

(c) $\lim\limits_{(x,y)\to(0,0)} \dfrac{(x-y)^2}{x^2+y^2}$

Q2. Show that the set $A = \{(x,y) \in \mathbb{R}^2 \mid y > 0\}$ is open.

Q3. Provide justification for the following questions:

(a) Can the function

$$f(x,y) = \frac{\sin(x+y)}{x+y}$$

be made continuous by suitably defining it at $(0,0)$?

(b) Can the function