

How to solve for L?

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hello, I have the following system of 3 equations:

$$2x$$

$$1 + L\left(\frac{2x}{1+(x^2+y^2-2)} + 1\right) = 0$$

$$2y$$

$$-1 + L\left(\frac{2y}{1+(x^2+y^2-2)} - 1\right) = 0$$

$$\arctg(x^2 + y^2 - 2) = 2 - x + y$$

The only thing I know for sure is that solving for L leads to the value $L = -1/3$, giving $(x,y) = (1,-1)$. But despite my many attempts I did not find a way to determine L.

Could you show me how to do that?

Thank you.

PS.

The equations system arises from the problem of determining the critical points of the function $f(x,y) = x - y$ with the condition $\arctg(x^2 + y^2 - 2) = 2 - x + y$, applying Lagrange's multipliers method.

How to solve for L?