

## AN UNEMPLOYMENT MODEL WITH TIME DELAY\*

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Dedicated to Dr. Vasile Drăgan on the occasion of his 70<sup>th</sup> anniversary

### Abstract

This paper analyses a mathematical model with time delay for the labor force on a market. Three variables are taken into account: the number of unemployed and employed persons in the market and the number of new vacancies created by the government and the private sector, which is based on a past value of the unemployment number in the creation of new vacancies. The positivity of the solutions is examined and the existence of a unique equilibrium point of the mathematical model is proved. A local stability analysis is undertaken, showing that the unique equilibrium is locally asymptotically stable, for any value of the time delay. Numerical simulations are carried out which substantiate the theoretical statements and suggest that the positive equilibrium point is globally asymptotically stable.

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**keywords:** unemployment model; mathematical model; time delay; stability; numerical simulation.

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