The approach of some economic models from a mathematical perspective began in the 19th century. The economic analysis done then will be later referred to as classical economy. The subjects were discussed and approached from an algebraic perspective, while the rest of the fields were ignored. Today, the theory of dynamic systems has become an essential tool in economic analysis, especially due to the modern computers. Some who lack the basic notions and the understanding of modern results from the theory of dynamic systems might find difficult to digest economic models.

Many economic models which depend on the temporal dimension involve the relationship between the exchange rate of a variable and its value at a certain time. For example, a model regarding the dynamic of the price presuppose that the exchange rate of the price is proportional to the difference between the demand and supply of the price and a model for economic growth from macroeconomics presuppose that the exchange rate of the capital stock means a constant fraction of the production value. When time is discreetly modeled (i.e. takes the values 1,2,3,…), relationships like this can modelled using difference equations. When time is modeled as a continuous variable, they can be described using differential equations.

The present bachelor’s paper proposes to present some results from the theory of discrete and continuous dynamic systems and to justify their use in the real world through the description of some economic models like: price and demand (microeconomics), Keynesian model and IS-LM (macroeconomics).

The purpose of the paper is to portray results from the theory of differential equations and the theory of difference equations. This will be considered from the theory of discrete and continuous dynamic systems point of view and some theoretical and practical examples (applies in economy) will be given for a better understanding of the notions.

The first chapter presents a few classes of differential equations, essential for understanding economic models: equations with separable variables, linear equations of first order and linear systems of differential equations. Inside of the linear systems of differential equations section, notions and results from matrix analysis theory, results regarding the existence and uniqueness of a solution, representations of the solutions and the case of systems of differential equations with constant coefficients will be introduced. Hereinafter, the notion of dynamic system will be presented and this theory’s auxiliary concepts: fixed point, limit sets and attractors, dynamic systems in real space, phase portraits and representations of trajectories described by dynamic systems of differential equations generated using Maple. The chapter ends with the presentations of the IS-LM model.

The second chapter presents difference equations of first order. The general classes of equations will be described, and also the particular cases of the general form. Later, some dynamic systems generated by difference equations will be presented, as well as dynamics generated by difference equations, stability criteria and Cobweb diagram. In the examples section, 2 mathematical models which use difference equations can be found, which are: depreciation and a demand and supply model.

Own contribution at the realization of the paper consists in the selection and structure of the bibliographic material, the thorough presentation of some demonstrations, the selection and solving of the examples present at the end of each chapter.