**Project 1- Visualize ODE with SciPy**

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Course number: CST - 305

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**Project 1- Visualize ODE with SciPy**

An ordinary differential equation (ODE) is a mathematical equation that describes the behavior of a system over time. The equation expresses a relationship between the dependent variables and the independent variable and their derivatives, which can be used to predict how the system will behave over time. This assignment is for solving a simple ODE for performance associated with a computer system: network bandwidth. The network bandwidth is a measure of the system performance that indicates the amount of data that can be transmitted over a network in each period. It is calculated by taking the rate of change of the network bandwidth, and the amount of data transmitted over the network. A high network bandwidth is desirable for a system as it ensures that data can be transmitted quickly and efficiently. However, if the network bandwidth is too low, it can lead to delays and bottlenecks in the system, resulting in a poor user experience. Therefore, it if the amount of data transmitted over a time states the how fast the data flows in between the system.

**The mathematical approach:**

1. The equation given to calculate ODE is dy/dt = rate – y

* rate: represents the rate of change of the network bandwidth.
* y: represents the amount of data transmitted over the network.
* dy/dt: rate of change at which the amount of data is transmitted over the network.

1. This ODE finds the rate at which the amount of data is transmitted over the network, therefore it is important to know the relationship between the amount of data transmitted over the network and the rate of change of the network bandwidth.

**Execution Result**

Chart

Description automatically generated