**Overview**

The given MATLAB script models the process of memorisation and forgetfulness using ordinary differential equations (ODEs). The graph simulates how an individual memorise information over time, taking into account how individuals absorb information and also takes into account forgetfulness, which remains a natural phenomenon. The model considers different retention constants and absorption rates to show their effects on learning.

**Code Breakdown**



**clc**; clears the command window

**clear;** removes all variables from memory

**close all;** closes any open figure windows

**Defining Parameters**

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**M** represents the total amount that is going to be memorised by individuals.

**A0** is an initial condition, which notes that the initial amount memorised by any individual (At time, t = 0) is **zero.**

A close-up of numbers

AI-generated content may be incorrect.

**a** is an array of retention constants for different individuals. This data would be used to analyse how well a person can retain information and affect the outcome of the model.

**c** is an array of absorption rates for individuals that represents how quickly a person is able to memorise new information.

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**A10** is the amount of information memorised at t = 10, based on their retention constants and absorption rates.

**A\_inf** represents the steady state amount of information that can be retained over a long period.

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**tspan** declares the period of time over which the graph or the analysis is being done. It represents the simulation running from **t = 0** to **t = 80**

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**k1** and **k2** are defined using their equations based on the absorption rates and retention constants and are required to be able to solve the differential equations below;

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Dot operators are used in the definition of **k1** and **k2** because the operations are to be performed on individual elements of the array of elements.



**Setting up the figure**

This variable defines the graphs to be plotted using the solved values of k1 and k2

A close-up of a computer code

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**Setting axes limits**

This code labels the x-axis and y-axis and specifies the title of the graph.

A computer screen shot of a computer code

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This code is used to set the limits of the x and y axes for the graph. The variable xmin takes the minimum value of the defined timespan, **tspan** and its maximum value as the limits for the x-axis, which holds time in days.

**Plotting the curves**

A close-up of a text

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An empty graphics object array is created to store the curves to be plotted

A screenshot of a computer program

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* A loop iterates through the selected parameter sets.
* The ODE is defined as an anonymous function.
* The ode45 solver numerically integrates to find A(t).
* An empty plot is created, allowing the animation to occur.

For the second for loop,

* The curve is drawn progressively by updating the data points.
* **Pause(0.02)** is added for clearer visualisation of the animation process

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After the animation is complete, the legend is displayed.

**Conclusion**

The script above defines the necessary variables, performs necessary operations, and plots the graphs for the different retention and absorption parameters to provide a graphical output of how different values of **a** and **c** affect memorization.