AFE BABALOLA UNIVERSITY, ADO-EKITI, EKITI STATE, NIGERIA
COLLEGE OF ENGINEERING
DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING

BACHELOR OF ENGINEERING ASSIGNMENT I

ENG 382: Engineering Mathematics IV

Session: 2019/2020   **Semester:** Second   **Unit:** 3   **Duration:** 3 days

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Instruction: Answer all the questions.

Question 1 [20 Marks]

A flat plate of mass m falling freely in air with velocity V is subjected to a downward gravitational force and an upward frictional drag force due to air. If the drag force, F_D, is given by Equation (1),

$$F_D = \frac{0.3V^2}{500 + (\ln V)^3} - 0.02V \tag{1}$$

and the terminal velocity is reached when the drag force equals the gravitational force, that is,

$$F_D = mg \tag{2}$$

taking the values of m and g to be 3.5 kg and 9.8 m/s² respectively, using a guess value of $V_0 = 0.5\, m/s$, and employing fixed-point iteration method, develop a MATLAB program, **without using "_function_" command,** to estimate the terminal velocity. Take the absolute percentage relative error tolerance to be less than or equal to 1E-11.