

Question 1: 6 + 8 Points

- (a) What is the standard mathematical form of an Initial Value Problem (IVP)?
- (b) Assume a differential equation $y'(t) = y^2 \sin(t)$ with values of $y(t)$ at $t = 0$ to be $y(0) = -3$. Use Euler method to approximate the value of $y(t)$ at $t = \pi/2$ by performing at least 2 iteration steps.

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Given a function $f(x, y) = |y|$, check if it satisfies Lipschitz condition. If it satisfies, find out the Lipschitz constant (L). *Hints: You might find the formula of Triangle Inequality $|a+b| \leq |a|+|b|$ useful for this problem.*