EECS203002 Ordinary Differential Equations

Bonus Project: Dog Tracing

Due: 23:59, November 24, 2023

I. Introduction

In this project, you are asked to write a program to sketch two types of paths of the following problem and demonstrate your program to show how it works.

II. Problem Description

A man stands at the junction of two perpendicular roads and his dog is watching him from one of the roads at a distance of A feet away. At a given instant the man starts to walk with constant speed v along the other road, and at the same time the dog begins to run toward the man with speed of kv. Assume that the dog always moves so that it is facing the man.

III. Goals (one or both are accepted)

(a) Write a program to sketch the path the dog will take if we set $k = 2$ and $A = 1, 3, 5$. Also, mark the value of A on the cartesian coordinate plane. (Adding 1 point to your final grade of ODE)

(b) Write a program to sketch the path the dog will take. Also, mark the value of A on the cartesian coordinate plane. Besides, the values k and A are user-defined parameters when running this program. (Adding 1 points to your final grade of ODE)

IV. Language

Python、MATLAB、or others.

V. Requirements/Grading

(a) Upload the source code of your program to eeclass platform.

(b) Demonstrate your project by downloading the source code from the eeclass platform and then compile the file in your environment

(using your machine). The time slots for demonstration will be determined later.

(c) The correctness of your results.

(d) Showing an animation of the dog tracing, along with an additional man tracing for speed comparison, will earn you an additional 50% bonus toward your selected goals.

(e) If the curve moves with correct constant velocity motion, your additional bonus will increase to 100% bonus toward your selected goals.

(f) Plagiarism is not allowed. If you are caught, you will FAIL this ODE course, not just getting 0 point in the bonus project.

Example:

The following figure is an example result of this project when $k = 2$ and $A = 1, 2, 3$.