Robotics
GENG5508

Lab Assignment 2 – *Individual* – Curve Driving   **Points: 10**

EXPERIMENT 1 (5 points)

Implement curve driving from an initial pose (position and orientation) to a desired pose using Hermite splines:

```
void SplineDrive(int x, int y, int alpha);
// x in robot's forward direction, y perpendicular (right HR)
// relative distance in mm; relative angle in degrees
```

Test your routine with the following parameters:
SplineDrive(100, 0, 0);   SplineDrive(0,100, 90);   SplineDrive(0,100,0);
SplineDrive(0, 0, 180);   SplineDrive(-50, -10, 0);   SplineDrive(-50,20,-90);
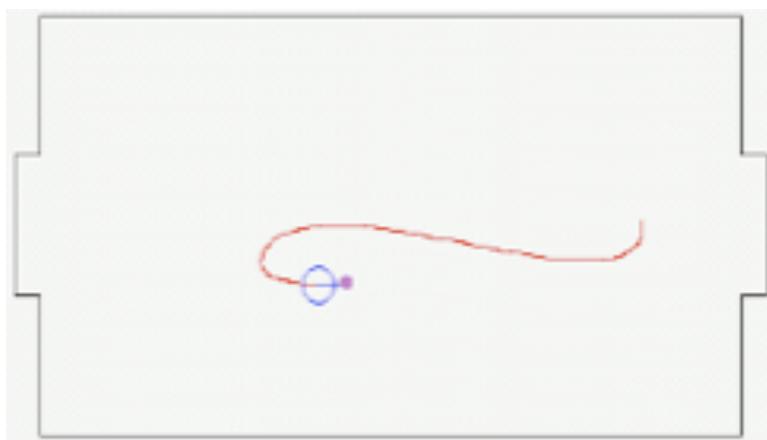
$$H_0(u) = 2u^3 - 3u^2 + 1$$

$$H_1(u) = -2u^3 + 3u^2$$

$$H_2(u) = u^3 - 2u^2 + u$$

$$H_3(u) = u^3 - u^2$$

$$P(u) = H_0(u)p_k + H_1(u)p_{k+1} + H_2(u)Dp_k + H_3(u)Dp_{k+1}$$

EXPERIMENT 2 (5 points)

Implement an algorithm that drives a robot along a given list (closed loop) of waypoints.

- Read waypoints from text-file "way.txt"
- Each line contains x and y coordinates in [mm]
- Be able to read at least 20 waypoints
- Drive the robot from its current position to the first waypoint, then continue to the next
- Allow some margin of error for reaching waypoints
- After the last waypoint, continue to drive to the first waypoint (endless loop)
- You may use the spline driving function from Ex.1 or any other method

Example file:
```
 100   100
1000   100
1000  1000
 100  1000
```