

Files: The accompanying file for this assignments is `assignment4.html`.

Delivery: upload the modified HTML file and any other necessary files to the Racó. All explanations and/or answers to the problems should be included in the HTML file.

Problem 1. Write a program to draw a cubic Hermite polynomial that interpolates two points P_0, P_1 , allowing the user to see and control the two points and the two tangent vectors at P_0 and P_1 .

Problem 2. Consider the particular case $P_0 = (0, 0)$, $P_1 = (2, 1)$, and tangent vectors $\vec{v}_0 = (1, 1)$ and $\vec{v}_1 = (1, 0)$.

(a) Compute the position of the curve at $t = 1/2$. How should the tangent vectors be modified in order to: keep the same directions at P_0 and P_1 , and at the same time go through $(1, 1)$ at $t = 1/2$? Solve the problem first, and then illustrate your result.

(b) What happens as you enlarge the tangent vectors?

(c) What happens if you invert the direction of the tangent vectors.

Problem 3. (a) With the help of your program, describe what happens in the following special cases:

1. The two points coincide (i.e., $P_0 = P_1$).
2. The two points coincide and the two tangent vectors are $(0, 0)$.
3. The two tangent vectors are equal to the vector $P_1 - P_0$.

(b) Explain each phenomenon in terms of the formulas defining the Hermite curve.