HW 5

Recall from HW 4 problem 1 the problem of finding the *intersection* of two cubic Bezier curves. In this problem, we will find the *closest points* on two cubic Bezier curves f and g:

$$\min_{t \in [0,1]^2} \|f(t_1) - g(t_2)\|.$$

1. Write a code to compute the Levenberg-Marquardt step p for a given value of the damping parameter λ:

```
function [p] = bezier_lm_step(t, pf, pg, lambda)
```

   If `lambda` is not explicitly provided, your code should default to $\lambda = 0$ (a Gauss-Newton step).

2. Use Gauss-Newton iteration with line search or Levenberg-Marquardt with adaptive λ to solve the closest point problem.

```
function [s,t] = bezier_closest(pf, pg)
%
% Compute points s in [0,1] and t in [0,1] such that
% the distance between f(s) and g(t) is minimized, where f and g
% are cubic Bezier curves with control points pf and pg (each of
% dimension d-by-4 with d >= 2).
```

   You should *not* assume that the closest point is necessarily on the interior of the domain; you may deal with the end conditions via any reasonable approach, but a barrier or penalty may be simplest. If there are multiple local minima, it is OK to choose one.