Project A worksheet: a fourth-order ODEBVP

> ONLY TWO RULES:
>   1. DON'T USE THE INTERNET
>   2. DO TALK TO EACH OTHER
> (ON 2., TRY TO *both* SHARE UNDERSTANDINGS *and* DIVIDE-UP TASKS.)

A flexible beam is clamped at two different heights α, β at the ends, and loaded with weights ($f(x)$ term), so that its vertical position $u(x)$ satisfies

$$u^{(4)}(x) = f(x), \qquad u(0) = \alpha, \quad u(1) = \beta, \quad u'(0) = 0, \quad u'(1) = 0$$

Propose and implement, in MATLAB/etc., a verified FD scheme for this problem.

(*Hint.* Consider a grid just as before: $m+2$ equally-spaced points, spacing $h = 1/(m+1)$, and grid points $x_j = jh$. It should be clear what equation to impose at x_0 and x_{m+1}. Likewise at the generic interior points, once you find a base scheme. What do you want to be true at the near-end points x_1 and x_m?)