Beta has to be the spline formed by four polynomials that respects the following rules:
$P_0(2) = 0$ -(1)
$P_0'(2) = 0$ -(2)
$P_0''(2) = 0$ -(3)
$P_1(0) = 1$ -(4)
$P_1'(0) = 0$ -(5)
$P_1(1) = P_0(1)$ -(6)
$P_1'(1) = P_0'(1)$ -(7)
$P_1''(1) = P_0''(1)$ -(8)
And symetric:
$P_3 = -P_0$ -(9)
$P_2 = -P_1$ -(10)

All polynomials $P_i = a_i * t^3 + b_i * t^2 + c_i * t + d_i$
Given (1), (2) and (3), $P_0 = (2-t)^3 * a_0$ Given 4, $d_1 = 1$
Given 5, $c_1 = 0$
Given 6, 7 and 8:
$$\begin{cases} a_1 * 1^3 + b_1 * 1^2 + 1 = (2-1)^3 * a_0 \\ 3 * a_1 * 1^2 + 2 * b_1 * 1 = -3 * (2-1)^2 * a_0 \\ 6 * a_1 * 1 + 2 * b_1 = 6 * (2-1) * a_0 \end{cases}$$
$$\begin{cases} a_1 + b_1 - a_0 = -1 \\ 3 * a_1 + 2 * b_1 + 3 * a_0 = 0 \\ 6 * a_1 + 2 * b_1 - 6 * a_0 = 0 \end{cases}$$
$a_1 = 3/4$
$b_1 = -3/2$
$a_0 = 1/4$
Given (9),
$P_0 = (2-t)^3 * 1/4$
$P_3 = (2+t)^3 * 1/4$
Given (10),
$P_1 = 3t^3/4 - 3t^2/2 + 1$
$P_2 = -3t^3/4 - 3t^2/2 + 1$
Also needed:
$P_1'' = 9t/2 - 3$
$P_0'' = 3(2-t)/2$