Decomposition of the cubic function using knots

The two knots are respectively denoted K_1 and K_2, with $K_1 = 5.333\ h$ and $K_2 = 17.333\ h$. Therefore the function $f_i(t)$ is composed of three cubic functions $f_{i1}(t)$, $f_{i2}(t)$ and $f_{i3}(t)$ for a gene G_i in the whole time interval:

$$
\begin{aligned}
f_{i1}(t) &= \beta_{i10} + \beta_{i11}\ t + \beta_{i12}\ t^2 + \beta_{i13}\ t^3, \quad (0 \leq t < K_1)\\
f_{i2}(t) &= \beta_{i20} + \beta_{i21}\ t + \beta_{i22}\ t^2 + \beta_{i23}\ t^3, \quad (K_1 \leq t < K_2)\\
f_{i3}(t) &= \beta_{i30} + \beta_{i31}\ t + \beta_{i32}\ t^2 + \beta_{i33}\ t^3, \quad (K_2 \leq t \leq 32).
\end{aligned}
$$

The three functions $f_{i1}(t)$, $f_{i2}(t)$ and $f_{i3}(t)$ should satisfy the conditions such that themselves, their first and second derivatives are continuous at each knot. Also their second derivatives are null at times $0\ h$ and $32\ h$. These constrains can be written as:

$$
\begin{aligned}
f_{i1}(K_1) = f_{i2}(K_1), \quad \frac{\mathrm{d}f_{i1}(K_1)}{\mathrm{d}t} = \frac{\mathrm{d}f_{i2}(K_1)}{\mathrm{d}t}, \quad \frac{\mathrm{d}^2 f_{i1}(K_1)}{\mathrm{d}t^2} = \frac{\mathrm{d}^2 f_{i2}(K_1)}{\mathrm{d}t^2}, \quad \frac{\mathrm{d}^2 f_{i1}(0)}{\mathrm{d}t^2} = 0,\\
f_{i2}(K_2) = f_{i3}(K_2), \quad \frac{\mathrm{d}f_{i2}(K_2)}{\mathrm{d}t} = \frac{\mathrm{d}f_{i3}(K_2)}{\mathrm{d}t}, \quad \frac{\mathrm{d}^2 f_{i2}(K_2)}{\mathrm{d}t^2} = \frac{\mathrm{d}^2 f_{i3}(K_2)}{\mathrm{d}t^2}, \quad \frac{\mathrm{d}^2 f_{i3}(32)}{\mathrm{d}t^2} = 0.
\end{aligned}
$$