3.

$b_{i,m}(u) = \binom{m}{i}(1-u)^{m-i} u^i$

Za $m=3$: $b_{i,3}(u) = \binom{3}{i}(1-u)^{3-i} u^i$

Baza f-je su Bernstein polinomi stupnja $m=3$:

$$\left.\begin{aligned} b_0(u) &= (1-u)^3 \\ b_1(u) &= 3u(1-u)^2 \\ b_2(u) &= 3u^2(1-u) \\ b_3(u) &= u^3 \end{aligned}\right\} + \Rightarrow T(u) = (1-u)^3 p_0 + 3u(1-u)^2 p_1 + 3u^2(1-u)p_2 + u^3 p_3$$

Za proizvoljni $u \in [0,1]$ i $r_i = (1-u)p_i + up_{i+1}$, $i = 0, 1, 2$

$s_i = (1-u)r_i + ur_{i+1}$, $i = 0, 1$

$t_0 = (1-u)s_0 + us_1$

vrijedi $f(u) = t_0$.

$$\begin{aligned} t_0 &= (1-u)s_0 + us_1 = \\ &= (1-u)((1-u)r_0 + ur_1) + u((1-u)r_1 + ur_2) \\ &= (1-u)^2 r_0 + 2u(1-u)r_1 + u^2 r_2 = \\ &= (1-u)^2((1-u)p_0 + up_1) + 2u(1-u)((1-u)p_1 + up_2) + u^2((1-u)p_2 + up_3) \\ &= (1-u)^3 p_0 + 3u(1-u)^2 p_1 + 3u^2(1-u)p_2 + u^3 p_3 = T(u) \end{aligned}$$

■