Zadatak 3

$$b_{i,n}(u) = \binom{n}{i}(1-u)^{n-i}u^i \quad za\ n = 3:$$
$$b_{i,3}(u) = \binom{3}{i}(1-u)^{3-i}u^i$$

Baza funkcije su Bernstein polinomi stupnja n = 3:

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

za proizvoljni $u \in [0,1]$ i

$$r_i = (1-u)p_i + up_{i+1}, \quad i = 0,1,2$$
$$s_i = (1-u)r_i + ur_{i+1}, \quad i = 0,1$$
$$t_0 = (1-u)s_0 + us_1$$

vrijedi $f(u) = t_0$.

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

Qed.