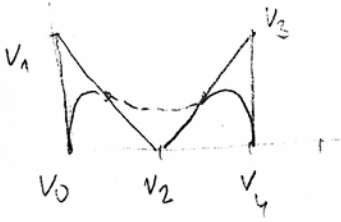


skopite param. vyjadreni B-spl. krivky stupňa $p=2$ smradiacim bodmi $V_0(0,0)$ $V_1(0,1)$ $V_2(1,0)$ $V_3(2,1)$ $V_4(2,0)$ na obrovnom ucelovom vektoru.



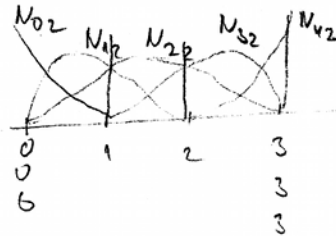
$$S(u) = \sum_{i=0}^4 V_i N_{i,2}(u) = V_0 N_{0,2}(u) + V_1 N_{1,2}(u) + V_2 N_{2,2}(u) + V_3 N_{3,2}(u) + V_4 N_{4,2}(u)$$

u celový vektor: $m = n + p + 1 = 4 + 2 + 1 = 7$

$$U = \{ u_0, u_1, u_2, u_3, u_4, u_5, u_6, u_7 \}$$

$$U = \{ 0, 0, 0, 1, 2, 3, 3, 3 \}$$

vyjadrenia



$$N_{0,2}(u) = \begin{cases} (1-u)^2 & u \in (0,1) \\ 0 & u \notin \end{cases}$$

$$N_{1,2}(u) = \begin{cases} \frac{1}{2} u(4-3u) & u \in (0,1) \\ \frac{1}{2} (2-u)^2 & u \in (1,2) \end{cases}$$

$$N_{2,2}(u) = \begin{cases} \frac{1}{2} u^2 & u \in (0,1) \\ \frac{1}{2} (-2u^2 + 6u - 3) & u \in (1,2) \\ \frac{1}{2} (3-u)^2 & u \in (2,3) \end{cases}$$

$$N_{3,2}(u) = \begin{cases} \frac{1}{2} (u-1)^2 & u \in (1,2) \\ \frac{1}{2} (-3u^2 + 14u - 15) & u \in (2,3) \end{cases}$$

$$N_{4,2}(u) = (u-2)^2 \quad u \in (2,3)$$

1. segment $u \in (0,1)$: $^1 S(u) = (1-u)^2 V_0 + \frac{1}{2} u(4-3u) V_1 + \frac{1}{2} u^2 V_2$
2. segment $u \in (1,2)$: $^2 S(u) = \frac{1}{2} (2-u)^2 V_1 + \frac{1}{2} (-2u^2 + 6u - 3) V_2 + \frac{1}{2} (u-1)^2 V_3$
3. segment $u \in (2,3)$: $^3 S(u) = \frac{1}{2} (3-u)^2 V_2 + \frac{1}{2} (-3u^2 + 14u - 15) V_3 + (u-2)^2 V_4$

param. vyjadrenie: $^1 x(u) = \frac{1}{2} u^2$
 $^1 y(u) = \dots$
 $^2 x(u) = \dots$
 $^2 y(u) = \dots$

$^3 x(u) = \dots$
 $^3 y(u) = \dots$

B. spl. funkcije pre uzlaznog redaka: $u_0, u_1, u_2, u_3, u_4, u_5, u_6, u_7$
 $0, 0, 0, 1, 2, 3, 3, 3$

$$N_{02}(u) = \frac{u-0}{0} \left[\frac{u-0}{0} N_{00}(u) + \frac{0-u}{0-0} N_{10}(u) \right] + \frac{1-u}{1-0} \left[\frac{u-0}{0} N_{10}(u) + \frac{1-u}{1-0} N_{20}(u) \right]$$

$$= (1-u) \left[(1-u) N_{20}(u) \right] = (1-u)^2 N_{20}(u)$$

$$N_{12}(u) = \frac{u-0}{1-0} \left[\frac{u-0}{0} N_{10}(u) + \frac{1-u}{1-0} N_{20}(u) \right] + \frac{2-u}{2-0} \left[\frac{u-0}{1-0} N_{20}(u) + \frac{2-u}{2-1} N_{30}(u) \right]$$

$$= u(1-u) N_{20}(u) + \frac{1}{2} \left[u(2-u) N_{20}(u) + (2-u)^2 N_{30}(u) \right]$$

$$= \left[u(1-u) + \frac{1}{2} u(2-u) \right] N_{20}(u) + \frac{1}{2} (2-u)^2 N_{30}(u)$$

$$N_{22}(u) = \frac{u-0}{2-0} \left[\frac{u-0}{1-0} N_{20}(u) + \frac{2-u}{2-1} N_{30}(u) \right] + \frac{3-u}{3-1} \left[\frac{u-1}{2-1} N_{30}(u) + \frac{3-u}{3-2} N_{40}(u) \right]$$

$$= \frac{u^2}{2} N_{20}(u) + \left[\frac{u}{2} (2-u) + \frac{(3-u)(u-1)}{2} \right] N_{30}(u) + \frac{(3-u)^2}{2} N_{40}(u)$$

$$N_{32}(u) = \frac{u-1}{3-1} \left[\frac{u-1}{2-1} N_{30}(u) + \frac{3-u}{3-2} N_{40}(u) \right] + \frac{3-u}{3-2} \left[\frac{u-2}{3-2} N_{40}(u) + \frac{3-u}{3-3} N_{50}(u) \right]$$

$$= \frac{1}{2} (u-1)^2 N_{30}(u) + \frac{1}{2} (-3u^2 + 14u - 15) N_{40}(u) + 0 \cdot N_{50}(u)$$

$$N_{42}(u) = \frac{u-2}{3-2} \left[\frac{u-2}{3-2} N_{40}(u) + \frac{3-u}{3-3} N_{50}(u) \right] + \frac{3-u}{3-3} \left[\frac{u-3}{3-3} N_{50}(u) + \frac{3-u}{3-3} N_{60}(u) \right]$$

$$= \frac{u-2}{1} \left[\frac{u-2}{1} N_{40}(u) \right] = (u-2)^2$$