$$N_{i,1}(t) = \begin{cases} 1 & \text{if } x_i \le t \le x_{i+1} \\ 0 & \text{otherwise.} \end{cases}$$

$$N_{i,k}(t) = \frac{(t - x_i)\, N_{i,k-1}(t)}{x_{i+k-1} - x_i} + \frac{(x_{i+k} - t)\, N_{i+1,k-1}(t)}{x_{i+k} - x_{i+1}}$$

$n=3$ $k=3$ $N_{i,3}(t)$ $i = 1,2,3,4$ open knot vector

$x_i = 0 \quad 1 \le i < k$

$x_i = i-k \quad k+1 \le i < n+1$

$x_i = n-k+2 \quad n+2 \le i \le n+k+1$

no. of knot values $n+1+k = 4+3 = 7$

$$X = [0\ 0\ 0\ 1\ 2\ 2\ 2] \qquad 0 \le t \le 2$$

$$P(t) = N_{1,3} P_1 + N_{2,3} P_2 + N_{3,3} P_3 + N_{4,3} P_4$$

$0 \le t < 1$

$N_{3,1}(t) = 1 \qquad N_{i,1}(t) = 0 \qquad i \ne 3$

$$N_{1,3}(t) = \frac{(t-0)\, N_{1,2}}{0-0} + \frac{(1-t)\, N_{2,2}(t)}{1-0} = (1-t)^2$$

$$N_{1,2} = \frac{(t-0)\, N_{1,1}}{0} + \frac{(0-t)\, N_{2,1}}{0-0} = 0$$

$$N_{2,2} = \frac{(t-0)\, N_{2,1}}{0-0} + \frac{(1-t)\, N_{3,1}}{1-0} = (1-t)$$

$$N_{2,3}(t) = \frac{(t-0)\, N_{2,2}}{1-0} + \frac{(2-t)\, N_{3,2}}{2-0} = t(1-t) + \frac{(2-t)}{2} t$$

$$N_{3,2} = \frac{(t-0)\, N_{3,1}}{1-0} + \frac{(2-t)\, N_{4,1}}{2-0} = t$$

$$N_{3,3} = \frac{(t-0)\, N_{3,2}}{2-0} + \frac{(2-t)\, N_{4,2}}{2-\phi} = \frac{t \times t}{2} = \frac{t^2}{2}$$

$$N_{4,2} = \frac{(t-1)\, N_{4,1}}{2-\phi} + \frac{(2-t)\, N_{5,1}}{2-2} = 0$$

$1 \le t\ 2$

$N_{4,1}(t) = 1 \qquad N_{i,1}(t) = 0 \qquad i \neq 4$

$$N_{1,3}(t) = \frac{(t-0)\,N_{1,2}}{0-0} = 0.$$

$$N_{2,3}(t) = \frac{(t-0)\,N_{2,2}}{1-0} + \frac{(2-t)\,N_{3,2}}{2-0} = 0 + \frac{(2-t)}{2}\times(2-t) = \frac{(2-t)^2}{2}$$

$$N_{2,2} = \frac{(t-0)\,N_{2,1}}{1-0} + \frac{(1-t)\,N_{3,1}}{1-0} = 0+0=0$$

$$N_{3,2} = \frac{(t-0)\,N_{3,1}}{1-0} + \frac{(2-t)\,N_{4,1}}{2-1} = 0 + \frac{2-t}{1}$$

$$N_{3,3}(t) = \frac{(t-0)\,N_{3,2}}{2-0} + \frac{(2-t)\,N_{4,2}}{2-1} = \frac{t}{2}(2-t) + (2-t)(t-1)$$

$$N_{4,2}(t) = \frac{(t-1)\,N_{4,1}}{2-1} + \frac{(2-t)\,N_{5,1}}{2-2} = (t-1)+0$$

$$N_{4,3}(t) = \frac{(t-1)\,N_{4,2}}{2-1} + \frac{(2-t)\,N_{5,2}}{2-2} = \frac{(t-1)(t-1)}{1} = (t-1)^2$$

$$N_{5,2}(t) = \frac{(t-2)\,N_{5,1}}{2-2} + \frac{(2-t)\,N_{6,1}}{2-2} = 0$$

$$N_{i,k}(t) = \frac{(t-x_i)\,N_{i,k-1}(t)}{x_{i+k-1}-x_i} + \frac{(x_{i+k}-t)\,N_{i+1,k-1}(t)}{x_{i+k}-x_{i+1}}$$

$k=3$

$x = [0\ 1\ 2\ 3\ 4\ 5\ 6]$

$0 < t < 1$

$N_{1,1}(t) = 1$ $\quad N_{i,1}(t) = 0 \quad i \neq 1$ $\quad$ 84a

$N_{1,2}(t) = t$ $\quad N_{i,2}(t) = 0 \quad i \neq 1$

$N_{1,3}(t) = \frac{t^2}{2}$ $\quad N_{i,3}(t) = 0 \quad i \neq 1$

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$1 < t < 2$

$N_{2,1}(t) = 1 \quad N_{i,1}(t) = 0 \quad i \neq 2$

$$N_{1,3}(t) = \frac{(t-0)\,N_{1,2}}{2-0} + \frac{(3-t)\,N_{2,2}}{3-1}$$

$$N_{1,2}(t) = \frac{(t-0)\,N_{1,1}}{1-0} + \frac{(2-t)\,N_{2,1}}{2-1}$$

$$= 0 + (2-t)$$

$$N_{2,2}(t) = \frac{(t-1)\,\overbrace{N_{2,1}}^{=1}}{2-1} + \frac{(3-t)\,\overbrace{N_{3,1}}^{=0}}{3-2}$$

$$= (t-1)$$

$N_{i,2}(t) = 0 \quad i \neq 1,2$

$$N_{1,3}(t) = \frac{t}{2}(2-t) + \frac{(3-t)}{2}(t-1)$$

$$N_{2,3}(t) = \frac{(t-1)\,N_{2,2}}{3-1} + \frac{(4-t)\,\overbrace{N_{3,2}}^{=0}}{}$$

$$= \frac{(t-1)(t-1)}{2} = \frac{(t-1)^2}{2}$$