P6578708 (9)

$= \frac{x^3}{24}$

$\sum_{i=0}^{3} B_{j-i}^{3}(x) = \sum_{i=0}^{3} B_{-i}^{3}(x)$ since $B_{j+k}^{k}(x+k) = B_j^k(x)$

$\xi_j \leq x \leq \xi_{j+1}$ $0 \leq x \leq 1$

$= \frac{1}{24}\left(\cancel{-x^3} + \cancel{3x^2} \cancel{-3x} + 1 + \cancel{3x^3} \cancel{-6x^2} + 4 \cancel{-3x^3} + \cancel{3x^2} + \cancel{3x} + 1 + \cancel{x^3}\right) = \frac{6}{24} = \frac{1}{4}$

ii) On $[0,1]$ with $\xi_j = j$, $j = 0, \pm 1, \pm 2 \ldots$
the only non zero B_p are for
$p = 0, -1, -2, -3$

$\therefore$ On $[0,1]$ $x = \sum_{p=-3}^{0} \lambda_p B_p^3$

Put $x_0 = 0$, $x_1 = 1/3$, $x_2 = 2/3$, $x_3 = 1$ and
form the matrix $24x_i = 24 \sum_{p=-3}^{0} \lambda_p B_p^3(x_i)$ $i = 0,1,2,3$

$$\left[\begin{array}{cccc|c} 1 & 4 & 1 & 0 & 0 \\ 8/27 & 93/27 & 60/27 & 1/27 & 8 \\ 1/27 & 60/27 & 93/27 & 8/27 & 16 \\ 0 & 1 & 4 & 1 & 24 \end{array}\right]$$

$$\left[\begin{array}{cccc|c} 1 & 5 & 5 & 1 & 24 \\ 9/27 & 153/27 & 153/27 & 9/27 & 24 \\ -7/27 & -33/27 & 33/27 & 7/27 & 8 \\ -1 & -3 & 3 & +1 & 24 \end{array}\right] \begin{array}{l} R1+R4 \\ R2+R3 \\ R3-R2 \\ R4-R1 \end{array}$$

$$\left[\begin{array}{cccc|c} 0 & -12 & -12 & 0 & -48 \\ 1/3 & 17/3 & 17/3 & 1/3 & 24 \\ 0 & -12/27 & 12/27 & 0 & 16/9 \\ -1 & -3 & 3 & 1 & 24 \end{array}\right] \begin{array}{l} R1-3R2 \\ R2\times 3 \\ R3-7/27R4 \\ \end{array}$$