Raffa Luca ZH07
Valmir Selmani

Serie 3

2) $I = \int_0^{\pi} \cos(x^2)\,dx$; $f(x) = \cos(x^2)$; $i = 0, \dots, 9$

$h = \frac{b-a}{2^i}$; $n = 2^i$

$$T_{00} = Tf\left(\frac{\pi}{1}\right) = \pi \cdot \left(\frac{\cos(0) + \cos(\pi^2)}{2}\right) = 1.528614 \cdot 10^{-1}$$

$$T_{10} = Tf\left(\frac{\pi}{2}\right) = \pi/2 \cdot \left(\frac{\cos(0) + \cos(\pi^2)}{2} + \cos\left(\left(\frac{\pi}{2}\right)^2\right)\right) = -1.150694$$

$$T_{20} = Tf\left(\frac{\pi}{4}\right) = \pi/4 \left(\frac{\cos(0) + \cos(\pi^2)}{2} + \cos(\pi/4) + \cos(\pi/2) + \cos(3\pi/4)\right) = 6.497609003 \cdot 10^{-1}$$

$$T_{30} = Tf(\pi/8) = \pi/8 \cdot \left(\frac{\cos(0) + \cos(\pi^2)}{2} + \cos((\pi/8)^2) + \cos((\pi/4)^2) + \cos((\pi \cdot 3/8)^2) + \cos((\pi/2)^2) + \cos((5\pi/8)^2) + \cos((3\pi/4)^2) + \cos((7\pi/8)^2)\right) = 0.60261302$$

$$T_{40} = Tf(\pi/16) = \pi/16 \left(\frac{\cos(0) + \cos(\pi^2)}{2} + \cos((\pi/16)^2) + \cos((\pi/8)^2) + \cos((3\pi/16)^2) + \cos((\pi/4)^2) + \cos((5\pi/16)^2) + \cos((3\pi/8)^2) + \cos((7\pi/16)^2) + \cos((\pi/2)^2) + \cos((9\pi/16)^2) + \cos((5\pi/8)^2) + \cos((11\pi/16)^2) + \cos((3\pi/4)^2) + \cos((13\pi/16)^2) + \cos((7\pi/8)^2) + \cos((15\pi/16)^2)\right)$$

$$= 0.5745285297$$

$$T_{01} = \frac{4 \cdot T_{10} - T_{00}}{3} = -1.5852123$$

$$T_{11} = \frac{4 \cdot T_{20} - T_{10}}{3} = 1.2499125449$$

$$T_{21} = \frac{4 \cdot T_{30} - T_{20}}{3} = 0.5869081102$$

$$T_{31} = \frac{4 \cdot T_{40} - T_{30}}{3} = 0.5651692722$$

$$T_{02} = \frac{16 \cdot T_{11} - T_{01}}{15} = 1.9389295832$$

$$T_{12} = \frac{16 \cdot T_{21} - T_{11}}{15} = 0.5427078060 9$$

$$T_{22} = \frac{16 \cdot T_{31} - T_{21}}{15} = 0.5637146835 66$$

$$T_{03} = \frac{64 \cdot T_{12} - T_{02}}{63} = 0.5284822017 01$$

$$T_{13} = \frac{64 \cdot T_{22} - T_{12}}{63} = 0.5640948126065$$

$$T_{04} = \frac{256 \cdot T_{13} - T_{03}}{255} = 0.5641876 0279$$