

Pracuj samodzielnie!!!

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Numer części: I Numer zadania: 4

$$\begin{array}{c|ccccc} x_k & -3 & -2 & 0 & 2 & 3 \\ y_k & 4 & 1 & 2 & 1 & 4 \end{array}$$

Wielomiany ortogonalne

$$\begin{cases} P_0(x) \equiv 1 \\ P_1(x) = x - c_1 \\ P_k(x) = (x - c_k) P_{k-1}(x) - d_k P_{k-2}(x) \end{cases}$$

$$c_k = \frac{\langle x P_{k-1}, P_{k-1} \rangle_N}{\langle P_{k-1}, P_{k-1} \rangle_N}$$

$$d_k = \frac{\langle P_{k-1}, P_{k-1} \rangle_N}{\langle P_{k-2}, P_{k-2} \rangle_N}$$

$$c_1 = \frac{\langle x P_0, P_0 \rangle}{\langle P_0, P_0 \rangle} = \frac{(-3) + (-2) + 0 + 2 + 3}{1 + 1 + 1 + 1 + 1} = \frac{0}{5} = 0$$

$$P_0 = 1$$

$$P_1 = x$$

$$c_2 = \frac{\langle x P_1, P_1 \rangle}{\langle P_1, P_1 \rangle} = \frac{(-2) + (-8) + 0 + 8 + 2}{9 + 4 + 0 + 4 + 9} = \frac{0}{26} = 0$$

$$d_2 = \frac{\langle P_1, P_1 \rangle}{\langle P_0, P_0 \rangle} = \frac{9 + 4 + 0 + 4 + 9}{1 + 1 + 1 + 1 + 1} = \frac{26}{5}$$

$$P_2 = (x - 0) x - \frac{26}{5} \cdot 1 = x^2 - \frac{26}{5}$$

Pamiętaj o zasadach nadsyłania rozwiązań!

Aby wyznaczyć $w_2^* \in \Pi_2$

$$w_2^*(x) = \sum_{i=0}^2 a_i P_i(x), \quad a_i = \frac{\langle f, P_i \rangle}{\langle P_i, P_i \rangle}$$

liczymy a_i

$$a_0 = \frac{4+2+1+2+1}{1+1+1+1+1} = \frac{9}{5}$$

$$a_1 = \frac{16+4+1+4+16}{16+4+9+4+16} = 1$$

$$a_2 = \frac{4 \cdot 9 - \frac{26}{5} + 2 \cdot 4 - \frac{26}{5} + 1}{(9 - \frac{26}{5})^2 + 4(4 - \frac{26}{5})^2 + (4 - \frac{26}{5})^2 + (9 - \frac{26}{5})^2 + (0 - \frac{26}{5})^2}$$

nie przepisatem y_k z tabelki

$$a_0 = \frac{4+1+2+1+4}{1+1+1+1+1} = \frac{12}{5}$$

$$a_1 = \frac{-12-2+0+2+12}{9+4+0+4+9} = \frac{0}{26} = 0$$

$$a_2 = \frac{-12-2+0+2+12}{16+4+9+4+16} = \frac{0}{58} = 0$$

$$a_2 = \frac{4 \cdot (9 - \frac{26}{5}) + 1 \cdot (4 - \frac{26}{5}) + 0 \cdot (0 - \frac{26}{5}) + 1 \cdot (4 - \frac{26}{5}) + 4 \cdot (9 - \frac{26}{5})}{(9 - \frac{26}{5})^2 + 4(4 - \frac{26}{5})^2 + (4 - \frac{26}{5})^2 + (9 - \frac{26}{5})^2 + (0 - \frac{26}{5})^2}$$

$$a_2 = \frac{8 \cdot (9 - \frac{26}{5}) + 2 \cdot (4 - \frac{26}{5})}{2 \cdot (9 - \frac{26}{5})^2 + 2 \cdot (4 - \frac{26}{5})^2 + (0 - \frac{26}{5})^2}$$

$$w_2^*(x) = \frac{12}{5} \cdot 1 + \frac{8 \cdot 9 - \frac{26}{5} + 2 \cdot (4 - \frac{26}{5})}{2 \cdot (9 - \frac{26}{5})^2 + 2 \cdot (4 - \frac{26}{5})^2 + (0 - \frac{26}{5})^2} \cdot x^2 - \frac{26}{5}$$