$$p(x)=\sum_{j=1}^{m} a_j\varphi_j(x) \qquad \begin{cases} A_{i,j}a_j = B_i, \quad A_{i,j}=(\varphi_i,\varphi_j), \quad B_i=(f,\varphi_i) \ - \ \text{przypadek ciągły} \\ \mathbf{Ca}=\mathbf{D},\ \mathbf{C}=\mathbf{A^TA},\ \mathbf{D}=\mathbf{A^TB},\ A_{i,j}=\varphi_j(x_i), \quad B_i=f(x_i)\ - \text{przypadek dyskretny} \end{cases}$$

$$T_m(x)=\begin{cases} T_1(x)=1 \\ T_2(x)=x \\ T_m(x)=2\cdot x\cdot T_{m-1}(x)-T_{m-2}(x) \end{cases} \qquad \begin{cases} x_i=\cos\left(\frac{2\cdot i-1}{m-1}\cdot\frac{\pi}{2}\right),\ i=1,2,\cdots,m-1 \\ x\to z : z=\frac{1}{2}[(b-a)x+(b+a)] \end{cases}$$

$$(\varphi_i,\varphi_j)=\int_a^b \varphi_i\varphi_j dx, \qquad (\varphi_i,\varphi_j,\mu)=\int_a^b \varphi_i\varphi_j\mu dx$$

Ortogonalność: $(\varphi_i,\varphi_j)\begin{cases} =0, & i\neq j \\ \neq 0, & i=j \end{cases}$ Ortonormalność: $(\varphi_i,\varphi_j)\begin{cases} =0, & i\neq j \\ =1, & i=j \end{cases}$

$$\left(T_i,T_j\frac{1}{\sqrt{1-x^2}}\right)\begin{cases} 0, & i\neq j \\ \frac{\pi}{2}, & i=j\neq 0 \\ \pi, & i=j=0 \end{cases}$$

$$s(x)=p(x)+\sum_{i=2}^{n-1} b_i(x-x_i)_+^k=\sum_{i=1}^{k+1} a_i x^{k+1-i}+\sum_{i=2}^{n-1} b_i(x-x_i)_+^k, \quad (x-x_i)_+^k=\begin{cases} (x-x_i)^k, & \text{dla } \ x>x_i \\ 0, & \text{dla } \ x\leqslant x_i \end{cases}$$

$$b_j=\frac{f_{j+1}-p(x_{j+1})-\sum_{i=2}^{j-1} b_i(x_{j+1}-x_i)^k}{(x_{j+1}-x_j)^k}, \quad j=2,3,\cdots,n-1$$

$$\alpha\cdot u_{xx}-u_t=f, \quad (x,t)\in\Omega, \quad a\leqslant x\leqslant b, \quad t\geqslant t_0$$

$$\begin{cases} u_{i,k+1}=\lambda u_{i-1,k}+(1-2\lambda)u_{i,k}+\lambda u_{i+1,k}-\Delta t\cdot f_{i,k}, \quad \lambda=\frac{\alpha\Delta t}{h^2}, \quad \lambda<0.5 \\ u_{i,k}=-\lambda u_{i-1,k+1}+(1+2\lambda)u_{i,k+1}-\lambda u_{i+1,k+1}+\Delta t\cdot f_{i,k+1} \end{cases}$$

$$u_{xx}-\beta u_{tt}=f, \quad (x,t)\in\Omega, \quad a\leqslant x\leqslant b, \quad t\geqslant t_0$$

$$u_{i,k+1}=\lambda u_{i-1,k}+u_{i,k}(2-2\lambda)+\lambda u_{i+1,k}-u_{i,k-1}-\frac{\Delta t^2}{\beta}f_{i,k}, \quad \lambda=\frac{\Delta t^2}{\beta h^2}, \quad \lambda<1$$

$$E(X)=\sum_{i=1}^{k} x_i p_i, \quad E(X)=\int_{-\infty}^{+\infty} xf(x)dx$$

$$V(X)=\sum_{i=1}^{k}(x_i-E(X))^2 p_i, \quad V(X)=\sigma^2=\int_{-\infty}^{+\infty}(x-E(X))^2 f(x)dx$$

$$D^2(X)=\left(\sum x_i^2 p_i\right)-\left(\sum x_i p_i\right)^2$$

$$D^2(X)=\int_{-\infty}^{+\infty} x^2 f(x)\,dx-\left(\int_{-\infty}^{+\infty} xf(x)dx\right)^2$$

$$F(x)=P(X\leqslant x)=\sum_{x_i\leqslant x} P(X=x_i)=\sum_{x_i\leqslant x} p_i, \quad F(x)\equiv P(X\leqslant x)=\int_{-\infty}^{x} f(u)du$$

$$\lim_{\Delta x\to 0^+}\frac{P(x\leqslant X<x+\Delta x)}{\Delta x}=\lim_{x\to 0}\frac{F(x+\Delta x)-F(x)}{\Delta x}=F'(x).$$