$$f(x)=\underbrace{\sum_{k}^{n}\frac{f^{(k)}(x_0)}{k!}\left(x-x_0\right)^k}_{P_n(x)}+\underbrace{\frac{f^{(n+1)}(\xi(x))}{(n+1)!}\left(x-x_0\right)^{n+1}}_{R_n(x)}$$

$$c=\frac{a+b}{2};\quad |error|=|r-c_n|\le E_a^n=\frac{b-a}{2^n};\quad n\ge\left\lceil\frac{\log(b-a)-\log(\varepsilon)}{\log(2)}\right\rceil$$

$$x_{i+1}=x_i-\frac{f(x_i)}{f'(x_i)};\quad X_{k+1}=X_k-\left[F'(X_k)\right]^{-1}F(X_k)$$

$$F(X)=\begin{bmatrix}f_1(x_1,x_2,\dots)\\ f_1(x_1,x_2,\dots)\\ \vdots\end{bmatrix};\quad F'(X)=\begin{bmatrix}\frac{\partial f_1}{\partial x_1} & \frac{\partial f_1}{\partial x_2} & \cdots\\ \frac{\partial f_2}{\partial x_1} & \frac{\partial f_2}{\partial x_2} & \cdots\\ \vdots & \vdots & \ddots\end{bmatrix}$$

$$x_{i+1}=x_i-f(x_i)\frac{(x_i-x_{i-1})}{f(x_i)-f(x_{i-1})}$$

$$y=mx+b;\quad m=\frac{N\Sigma(xy)-\Sigma x\Sigma y}{N\Sigma(x^2)-(\Sigma x)^2};\quad b=\frac{\Sigma y-m(\Sigma x)}{N}$$

$$\Phi(a_0,a_1,\dots)=\sum_{i=0}^{N}\left|y_i-f(x_i)\right|^2;\quad \frac{\partial\Phi(a_0,a_1,\dots)}{\partial a_i}=0\quad;\forall a_i\implies\ \textit{Normal Equations}$$

$$P_n(x)=\sum_{i=0}^{n}b_i\prod_{k=0}^{i-1}(x-x_k);\quad b_i:\textit{The } i^{th}\ \textit{DD}$$

$$P_n(x)=\sum_{i=0}^{n}f(x_i)\ell_i(x);\quad \ell_i(x)=\prod_{j=0,\ j\ne i}^{n}\frac{(x-x_j)}{(x_i-x_j)};\quad |f(x)-P_n(x)|\le\frac{M}{4(n+1)}\left(\frac{b-a}{n}\right)^{n+1}$$

$$\int\approx\frac{L+U}{2};\quad Error\le\frac{U_L}{2};\quad L(f,P)=\sum_{i=0}^{n-1}m_i(x_{i+1}-x_i);\quad U(f,P)=\sum_{i=0}^{n-1}M_i(x_{i+1}-x_i)$$

$$I_T=(b-a)\frac{f(b)+f(a)}{2};\quad I_T=\sum_{i=0}^{n-1}\frac{1}{2}(x_{i+1}-x_i)\left(f(x_{i+1})+f(x_i)\right)$$

$$I_T=h\left[\frac{1}{2}\left[f(x_0)+f(x_n)\right]+\sum_{i=1}^{n-1}f(x_i)\right];\quad |Error|\le\frac{b-a}{12}h^2\ max|f''(x)_{x\in[a,b]}|$$

$$S_{1/3}=\frac{h}{3}\sum_{i=0}^{n}\Delta f(x_i);\quad \Delta\equiv 1\ \overline{4\ 2}\ 1$$

$$S_{3/8}=\frac{3h}{8}\sum_{i=0}^{n}\Delta f(x_i);\quad \Delta\equiv 1\ \overline{3\ 3\ 2}\ 1$$

$$S_{3/8}=\frac{3h}{8}\left\{f(x_0)+3\sum_{i=1,4,7,\dots}^{n-2}f(x_i)+3\sum_{i=2,5,8,\dots}^{n-1}f(x_i)+2\sum_{i=3,6,9,\dots}^{n-2}f(x_i)+f(x_n)\right\}$$