$$GR_{\Delta t}=\frac{N(t)-N(t-\Delta t)}{N(t-\Delta t)}\cdot 100\%$$

$$N(t)=N(t_1)\cdot(1+GR_{\Delta t})^{\frac{t-t_1}{\Delta t}}$$

$$CAGR=\left(\sqrt[year_2-year_1]{\frac{N(year_2)}{N(year_1)}}-1\right)\cdot 100\%$$

$$r=\sqrt{1-\frac{\sum_{i=1}^{n}\left[f(t_i)-N(t_i)\right]^2}{\sum_{i=1}^{n}\left[N-N(t_i)\right]^2}};\quad 0\le r\le 1$$

$$MAE=\frac{1}{n}\sum_{i=1}^{n}\left|f(t_i)-N(t_i)\right|$$

$$MAPE=\frac{1}{n}\sum_{i=1}^{n}\frac{\left|f(t_i)-N(t_i)\right|}{N(t_i)}$$

$$RMSE=\sqrt{\frac{1}{n}\sum_{i=1}^{n}\left[N(t_i)-f(t_i)\right]^2}$$

$$f_a(t)=N(t_e)+\left[N(t_e)-N(t_e-\Delta t)\right]\frac{t-t_e}{\Delta t}$$

$$f_m(t)=N(t_e)\cdot\left[\frac{N(t_e)}{N(t_e-\Delta t)}\right]^{\frac{t-t_e}{\Delta t}}$$

$$f_a(t)=N(t_e)+k\left(t-t_e\right)$$

$$k=\frac{\sum_{i=1}^{n-1}N(t_i)(t_i-t_e)-N(t_e)\sum_{i=1}^{n-1}(t_i-t_e)}{\sum_{i=1}^{n-1}(t_i-t_e)^2}$$

$$f_m(t)=N(t_e)\cdot k^{\left(t-t_e\right)}$$

$$\ln k=\frac{\sum_{i=1}^{n-1}\ln\left(N(t_i)\right)(t_i-t_e)-\ln\left(N(t_e)\right)\sum_{i=1}^{n-1}(t_i-t_e)}{\sum_{i=1}^{n-1}(t_i-t_e)^2}$$

$$L(t;M,a,b)=L(t)=\frac{M}{1+e^{-a(t-b)}}$$

$$a=\frac{1}{t_2-t_1}\left[\ln\left(\frac{M}{N(t_1)}-1\right)-\ln\left(\frac{M}{N(t_2)}-1\right)\right]$$

$$b=t_1+\frac{1}{a}\ln\left[\frac{M}{N(t_1)}-1\right]$$

$$LL(t;M,a,t_e,N(t_e))=\frac{M\cdot N(t_e)}{N(t_e)+\left[M-N(t_e)\right]e^{-a(t-t_e)}}$$

$$a=\frac{2}{\Delta t}\ln\left(\frac{1}{u}-1\right)\quad b=t_s+\frac{\Delta t}{2}$$

$$B(t;M,p,q,t_s)=B(t)=M\,\frac{1-e^{-(p+q)(t-t_s)}}{1+\frac{q}{p}e^{-(p+q)(t-t_s)}}$$