$$\mathring{e}_x = \int_0^{+\infty} {}_tp_x dt, \quad e_x = \sum_{k=1}^{+\infty} k \cdot {}_kp_x \cdot q_{x+k}, \quad e_x = \sum_{k=1}^{+\infty} {}_kp_x$$

$$\mu_{x+t} = -\frac{d}{dt}\ln({}_tp_x)$$

$$A_x = \sum_{k=0}^{+\infty} v^{k+1} \cdot {}_kp_x \cdot q_{x+k}, \quad A_x^{(m)} = A_x \cdot \frac{i}{i^{(m)}}, \quad \bar{A}_x = A_x \cdot \frac{i}{\delta}$$

$$A_{x:\overset{1}{\overline{n}|}} = v^n \cdot {}_np_x, \quad A_{x:\overline{n}|} = A^1_{x:\overline{n}|} + A_{x:\overset{1}{\overline{n}|}}, \quad {}_{n|}A_x = A_x - A^1_{x:\overline{n}|}$$

$$E(Z) = c_1 \cdot A_x + (c_2 - c_1) \cdot {}_{1|}A_x + (c_3 - c_2) \cdot {}_{2|}A_x + \dots$$

$$E(Z) = c_n \cdot A^1_{x:\overline{n}|} + (c_{n-1} - c_n) \cdot A^1_{x:\overline{n-1}|} + (c_{n-2} - c_{n-1}) \cdot A^1_{x:\overline{n-2}|} + \dots + (c_1 - c_2) \cdot A^1_{x:\overline{1}|}$$

$$(IA)_x = \sum_{k=0}^{+\infty}(k+1)v^{k+1} \cdot {}_kp_x \cdot q_{x+k}, \quad (I\bar{A})_x = (IA)_x \cdot \frac{i}{\delta}$$

$$(I^{(m)}\bar{A})_x = \frac{i}{\delta}(IA)_x - \frac{i}{\delta}A_x + p \cdot A_x, \quad p = \frac{1}{\delta} \cdot \frac{i - i^{(m)}v^{(m)}}{i^{(m)}v^{(m)}}, \quad (\bar{I}\bar{A})_x = \frac{i}{\delta}(IA)_x - \frac{i}{\delta}A_x + \frac{i-\delta}{\delta^2}A_x$$

$$\ddot{a}_x = \sum_{k=0}^{+\infty} \ddot{a}_{\overline{k+1}|} \cdot {}_kp_x \cdot q_{x+k}, \quad \ddot{a}_x = \sum_{k=0}^{+\infty} v^k \cdot {}_kp_x$$

$$\ddot{a}_x^{(m)} = \frac{1}{m} \cdot \sum_{t=0}^{+\infty} v^{\frac{t}{m}} \cdot {}_{\frac{t}{m}}p_x, \quad \ddot{a}_x^{(m)} = \alpha(m) \cdot \ddot{a}_x - \beta(m), \quad \alpha(m) = \frac{di}{d^{(m)}i^{(m)}}, \quad \beta(m) = \frac{i - i^{(m)}}{d^{(m)}i^{(m)}}$$

$$\bar{a}_x = \int_0^{+\infty} v^t \cdot {}_tp_x dt, \quad \bar{a}_{x:\overline{n}|} = \int_0^n v^t \cdot {}_tp_x dt, \quad {}_{n|}\bar{a}_x = \int_n^{+\infty} v^t \cdot {}_tp_x dt$$

$$E(Z) = \sum_{k=0}^{+\infty} v^k \cdot r_k^{(m)} \cdot {}_kp_x - \sum_{k=0}^{+\infty} c_{k+1}^{(m)} \cdot v^{k+1} \cdot {}_kp_x \cdot q_{x+k}$$

$$\ddot{a}_{x:\overline{n}|} = \sum_{k=0}^{n-1} \ddot{a}_{\overline{k+1}|} \cdot {}_kp_x \cdot q_{x+k} + \ddot{a}_{\overline{n}|} \cdot {}_np_x, \quad \ddot{a}_{x:\overline{n}|} = \sum_{k=0}^{n-1} v^k \cdot {}_kp_x$$

$${}_{n|}\ddot{a}_x = {}_np_x \cdot v^n \cdot \ddot{a}_{x+n}, \quad {}_{n|}\ddot{a}_x = \ddot{a}_x - \ddot{a}_{x:\overline{n}|}$$

$$\ddot{a}^{(m)}_{x:\overline{n}|} = \alpha(m) \cdot \ddot{a}_{x:\overline{n}|} - \beta(m)(1 - {}_np_x \cdot v^n)$$

$$P_x = \frac{A_x}{\ddot{a}_x}, \quad P^1_{x:\overline{n}|} = \frac{A^1_{x:\overline{n}|}}{\ddot{a}_{x:\overline{n}|}}, \quad P_{x:\overset{1}{\overline{n}|}} = \frac{A_{x:\overset{1}{\overline{n}|}}}{\ddot{a}_{x:\overline{n}|}}, \quad P({}_{n|}\ddot{a}_x) = \frac{{}_{n|}\ddot{a}_x}{\ddot{a}_{x:\overline{n}|}}, \quad P({}_{n|}\ddot{a}_x) = P_{x:\overset{1}{\overline{n}|}} \cdot \ddot{a}_{x+n}$$

$$P^{(m)}(A_x) = \frac{A_x}{\ddot{a}_x^{(m)}}, \quad P^{(m)}(A^1_{x:\overline{n}|}) = \frac{A^1_{x:\overline{n}|}}{\ddot{a}^{(m)}_{x:\overline{n}|}}, \quad P^{(m)}(A_{x:\overset{1}{\overline{n}|}}) = \frac{A_{x:\overset{1}{\overline{n}|}}}{\ddot{a}^{(m)}_{x:\overline{n}|}}, \quad P^{(m)}(A_{x:\overline{n}|}) = \frac{A_{x:\overline{n}|}}{\ddot{a}^{(m)}_{x:\overline{n}|}}$$

$$\bar{P}(\bar{A}_x)=\frac{\bar{A}_x}{\bar{a}_x},\quad \bar{P}(\bar{A}^{1}_{x:\overline{n}|})=\frac{\bar{A}^{1}_{x:\overline{n}|}}{\bar{a}_{x:\overline{n}|}},\quad \bar{P}(\bar{A}_{x:\overset{1}{\overline{n}|}})=\frac{\bar{A}_{x:\overset{1}{\overline{n}|}}}{\bar{a}_{x:\overline{n}|}},\quad \bar{P}(\bar{A}_{x:\overline{n}|})=\frac{\bar{A}_{x:\overline{n}|}}{\bar{a}_{x:\overline{n}|}}$$

$$\bar{P}({}_{n|}\bar{a}_x)=\frac{{}_{n|}\bar{a}_x}{\bar{a}_{x:\overline{n}|}},\quad \bar{P}({}_{n|}\bar{a}_x)=\bar{P}(\bar{A}_{x:\overset{1}{\overline{n}|}})\cdot\bar{a}_{x+n}$$

$$\sum_{k=0}^{+\infty}c_{k+1}\cdot v^{k+1}\cdot {}_kp_x\cdot q_{x+k}=\sum_{k=0}^{+\infty}\Pi_k\cdot v^k\cdot {}_kp_x$$

$$\int_0^{+\infty}c(t)\cdot v^t\cdot {}_tp_x\cdot\mu_{x+t}dt=\int_0^{+\infty}\pi(t)\cdot v^t\cdot {}_tp_xdt$$

$${}_kV=A_{x+k}-P_x\cdot\ddot{a}_{x+k}$$

$${}_kV=\begin{cases}A^{\;1}_{x+k:\overline{n-k}|}-P^{1}_{x:\overline{n}|}\cdot\ddot{a}_{x+k:\overline{n-k}|}, & k=0,1,\ldots,n-1;\\ 0, & k=n,n+1,\ldots\end{cases}$$

$${}_kV=\begin{cases}A_{x+k:\overset{1}{\overline{n-k}|}}-P_{x:\overset{1}{\overline{n}|}}\cdot\ddot{a}_{x+k:\overline{n-k}|}, & k=0,1,\ldots,n-1;\\ 1, & k=n;\\ 0, & k=n+1,n+2,\ldots\end{cases}$$

$${}_kV=\sum_{j=0}^{+\infty}c_{j+k+1}\cdot v^{j+1}\cdot {}_jp_{x+k}\cdot q_{x+k+j}-\sum_{j=0}^{+\infty}\Pi_{k+j}\cdot v^j\cdot {}_jp_{x+k}$$

$$\Pi_k=(v\cdot {}_{k+1}V-{}_kV)+v\cdot(c_{k+1}-{}_{k+1}V)\cdot q_{x+k}$$

$$L=\sum_{k=0}^{+\infty}\Lambda_k\cdot v^k,\quad D(L)=\sum_{k=0}^{+\infty}v^{2k+2}\cdot(c_{k+1}-{}_{k+1}V)^2\cdot {}_{k+1}p_x\cdot q_{x+k}$$

$$V(t)=\int_t^{+\infty}c(s)\cdot v^{s-t}\cdot {}_{s-t}p_{x+t}\cdot\mu_{x+s}ds-\int_t^{+\infty}\pi(s)\cdot v^{s-t}\cdot {}_{s-t}p_{x+t}ds$$

$$\pi(t)=(V'(t)-\delta\cdot V(t))+(c(t)-V(t))\cdot\mu_{x+t}$$

$$E(Z)=\sum_{j=1}^{m}\sum_{k=0}^{+\infty}c_{j,k+1}\cdot v^{k+1}\cdot {}_kp_x\cdot q_{j,x+k},\quad E(Z)=\sum_{j=1}^{m}\int_0^{+\infty}c_j(t)\cdot v^t\cdot f_j(t)dt$$

$${}_kV=\sum_{j=1}^{m}\sum_{i=0}^{+\infty}c_{j,k+i+1}\cdot v^{i+1}\cdot {}_ip_{x+k}\cdot q_{j,x+k+i}-\sum_{i=0}^{+\infty}\Pi_{k+i}\cdot v^i\cdot {}_ip_{x+k}$$

$$V(t)=\sum_{j=1}^{m}\int_0^{+\infty}c_j(t+s)\cdot v^s\cdot {}_sp_{x+t}\cdot\mu_{j,x+t+s}ds-\int_0^{+\infty}\pi(t+s)\cdot v^s\cdot {}_sp_{x+t}ds$$

$$\sum_{n=0}^{m}c_n\cdot P\{N=n\}=\sum_{k=0}^{m}S_k\Delta^kc_0$$