```
α = 1.383;
β = 3;
n = 10 000;
k = 3;
t = 0.7;
a = 2;
b = 1;
c = 0.5;
z = 3;
s1 = 0;
s2 = 0;
s3 = 0;
s4 = 0;
s5 = 0;
s6 = 0;
s7 = 0;
s8 = 0;
s9 = 0;
s10 = 0;
s11 = 0;
s12 = 0;
s13 = 0;
s14 = 0;
s15 = 0;
s16 = 0;
s17 = 0;
s18 = 0;
s19 = 0;
s20 = 0;
w = 0.2;

 IT = 10 000;
R = 1 - Exp[-α * t^-β];
For[i = 1, i ≤ IT, i++,

  x = Table[(-1/α Log[ Random[]])^(-1/β), {n}];

 maxima[x_] := Union[Rest[FoldList[Min, x[[1]], x]]];
 tt = maxima[x] ;
 g = Length[tt];
 ttt = Sort[tt, Greater];
 If [g ≥ k, d = ttt[[k]], d = Min[{ttt}]];
 V = b + d^-β;
 αmL = k * d^β;
 s1 += (αmL - α)^2;
 αSE = (a + k)/V ;
 s2 += (αSE - α)^2;
 αLinex = (k + a)/c Log[((c + V)/V)]; s3 += (αLinex - α)^2;
```

```mathematica
I1 = (  (z + V)/V  ) ^ (-k - a);

I2 = (  ((c + z) + V)/V  ) ^ (-k - a);

αwLinex = 1/c Log[ (  ( (z+V)/V ) ^ (-k - a) / ( (c+z)+V)/V ) ^ (-k - a) ) ]; s4 += (αwLinex - α) ^2;

mle1 =
  Minimize[ {(αmL * h₁ + αSE * h₂ - α)², h₁ + h₂ == 1, 0 < h₁ < 1, 0 < h₂ < 1}, {h₁, h₂}];
d1 = mle1[[1]]; dr1 = h₁ /. mle1[[2, 1]];
dr2 = h₂ /. mle1[[2, 2]]; αseLP = αmL * dr1 + αSE * dr2;
 s5 += (αseLP - α) ^2;

mle2 = Minimize[ { ( ( - 1/c Log[ (Exp[-αmL * c]) * h₃ + h₄ * (1 + c/V) ^ (-a - k)] ) - α)²,
     h₃ + h₄ == 1, 0 < h₃ < 1, 0 < h₄ < 1}, {h₃, h₄}];
d2 = mle2[[1]]; dr3 = h₃ /. mle2[[2, 1]];
dr4 = h₄ /. mle2[[2, 2]];
αLinexLP = - 1/c Log[ (Exp[-αmL * c]) * dr3 + dr4 * (1 + c/V) ^ (-a - k)];
s6 += (αLinexLP - α) ^2;


mle3 = Minimize[ { ( ( 1/c Log[ (Exp[-αmL * c]) * h₅ + h₆ * ( (1 + z/V) ^ (-a - k) / (1 + (z+c)/V) ^ (-a - k) ) ] ) - α)²,
     h₅ + h₆ == 1, 0 < h₅ < 1, 0 < h₆ < 1}, {h₅, h₆}];
d3 = mle3[[1]]; dr5 = h₅ /. mle3[[2, 1]];
dr6 = h₆ /. mle3[[2, 2]];

αWLinexLP = 1/c Log[ (Exp[-αmL * c]) * dr5 + dr6 * ( (1 + z/V) ^ (-a - k) / (1 + (z+c)/V) ^ (-a - k) ) ];

s7 += (αWLinexLP - α) ^2;
αseW = αmL * w + αSE * (1 - w);
s8 += (αseW - α) ^2;
αINEXW = - 1/c Log[ (Exp[-αmL * c]) * w + (1 - w) * (1 + c/V) ^ (-a - k)];
s9 += (αINEXW - α) ^2;

αWINEXW = 1/c Log[ (Exp[-αmL * c]) * w + (1 - w) * ( ( (z+V)/V ) ^ (-k - a) / ( ((c+z)+V)/V ) ^ (-k - a) ) ];

s10 += (αWINEXW - α) ^2;


RML = 1 - Exp[-αmL * t^-β]; s11 += (RML - R) ^2;


RSE = 1 - ( V/(V + t^-β) ) ^ (a + k); s12 += (RSE - R) ^2;

f = Log[ E^-c + E^-c * V^ (a + k) * Sum[ (c)^i/Gamma[i + 1] (V + i t^-β)^(-k-a), {i, 1, Infinity}] ];
```

```
Rlinex = -1/c * f;
s13 += (Rlinex - R)^2;
RWINEX =
  1/c * Log[(E^-z + E^-z * V^(a + k) * Sum[(z)^i/Gamma[i + 1] (V + i t^-β)^-k-a, {i, 1, Infinity}])/
    (E^-(c+z) + E^-(c+z) * V^(a + k) * Sum[((c + z))^i/Gamma[i + 1] (V + i t^-β)^-k-a, {i, 1, Infinity}])
  ];
s14 += (RWINEX - R)^2;
mle4 =
  Minimize[{(RML * h_7 + RSE * h_8 - R)^2, h_7 + h_8 == 1, 0 < h_7 < 1, 0 < h_8 < 1}, {h_7, h_8}];
d4 = mle4[[1]]; dr7 = h_7 /. mle4[[2, 1]];
dr8 = h_8 /. mle4[[2, 2]]; RSELP = RML * dr7 + RSE * dr8;
s15 += (RSELP - R)^2;

mle5 =
  Minimize[{((-1/c Log[(Exp[-RML * c]) * h_9 + h_10 * E^-c + E^-c * V^(a + k) * Sum[(c)^i/Gamma[i + 1]
      (V + i t^-β)^-k-a, {i, 1, Infinity}]]) - R)^2,
    h_9 + h_10 == 1, 0 < h_9 < 1, 0 < h_10 < 1}, {h_9, h_10}];
d5 = mle5[[1]]; dr9 = h_9 /. mle5[[2, 1]];
dr10 = h_10 /. mle5[[2, 2]];

RLinexLP = -1/c Log[(Exp[-RML * c]) * dr9 + dr10 * E^-c +
    E^-c * V^(a + k) * Sum[(c)^i/Gamma[i + 1] (V + i t^-β)^-k-a, {i, 1, Infinity}]];
s16 += (RLinexLP - R)^2;

mle6 = Minimize[
  {((1/c Log[(Exp[-RML * c]) * h_11 + h_12 * ((E^-z + E^-z * V^(a + k) * Sum[(z)^i/Gamma[i + 1]
      (V + i t^-β)^-k-a, {i, 1, Infinity}])/ (E^-(c+z) + E^-(c+z) * V^(a +
      k) * Sum[(c + z)^i/Gamma[i + 1] (V + i t^-β)^-k-a, {i, 1, Infinity}]))]) -
    R)^2, h_11 + h_12 == 1, 0 < h_11 < 1, 0 < h_12 < 1}, {h_11, h_12}];
d6 = mle6[[1]]; dr11 = h_11 /. mle6[[2, 1]];
dr12 = h_12 /. mle6[[2, 2]];

RWLinexLP = 1/c Log[(Exp[-RML * c]) * dr11 + dr12 *
```

$$\left(\left(E^{-z} + E^{-z} * V^{\wedge}(a+k) * \text{Sum}\left[\frac{(z)^{\wedge}i}{\text{Gamma}[i+1]} (V + i\, t^{\wedge} - \beta)^{-k-a}, \{i, 1, \text{Infinity}\}\right]\right)\right/$$

$$\left(E^{-(c+z)} + E^{-(c+z)} * V^{\wedge}(a+k) *\right.$$

$$\left.\left.\left.\text{Sum}\left[\frac{((c+z))^{\wedge}i}{\text{Gamma}[i+1]} (V + i\, t^{\wedge} - \beta)^{-k-a}, \{i, 1, \text{Infinity}\}\right]\right)\right)\right];$$

```
s17 += (RWLinexLP - R) ^2;


RseW = RML * w + RSE * (1 - w) ;
s18 += (RseW - R) ^2;
```

$$\text{RLIenxw} = -\frac{1}{c} \text{Log}\left[(\text{Exp}[-\text{RML} * c]) * w + (1-w) * E^{-c} + \right.$$

$$\left.E^{-c} * V^{\wedge}(a+k) * \text{Sum}\left[\frac{(c)^{\wedge}i}{\text{Gamma}[i+1]} (V + i\, t^{\wedge} - \beta)^{-k-a}, \{i, 1, \text{Infinity}\}\right]\right];$$

```
s19 += (RLIenxw - R) ^2;
```

$$\text{RWLinexLPw} = \frac{1}{c} \text{Log}\left[(\text{Exp}[-\text{RML} * c]) * w + (1-w) * \right.$$

$$\left(\left(E^{-z} + E^{-z} * V^{\wedge}(a+k) * \text{Sum}\left[\frac{(z)^{\wedge}i}{\text{Gamma}[i+1]} (V + i\, t^{\wedge} - \beta)^{-k-a}, \{i, 1, \text{Infinity}\}\right]\right)\right/$$

$$\left(E^{-(c+z)} + E^{-(c+z)} * V^{\wedge}(a+k) *\right.$$

$$\left.\left.\left.\text{Sum}\left[\frac{((c+z))^{\wedge}i}{\text{Gamma}[i+1]} (V + i\, t^{\wedge} - \beta)^{-k-a}, \{i, 1, \text{Infinity}\}\right]\right)\right)\right];$$

```
s20 += (RWLinexLPw - R) ^2;
Print["k =", k];
Print["c = ", c];
Print["w =", w];
Print["z =", z];
Print[" α ml =", s1 / IT];
Print[" α se =", s2 / IT];
Print["α linex =", s3 / IT];
Print[" α wlinex =", s4 / IT];
Print[" α selp=", s5 / IT];
Print[" α LINXlp=", s6 / IT];
Print[" α wLINXlp=", s7 / IT];
Print[" α sew=", s8 / IT];
Print[" α linex w=", s9 / IT];
Print[" α wlinex w=", s10 / IT];


Print[" reliability =", reliability];
Print[" R ml =", s11 / IT];
Print[" R se =", s12 / IT];
Print["R linex =", s13 / IT];
Print[" R wlinex =", s14 / IT];
Print[" R selp=", s15 / IT];
Print[" R LINXlp=", s16 / IT];
Print[" R wLINXlp=", s17 / IT];
```

```
Print[" R sew=", s18 / IT];
Print[" R linexw=", s19 / IT];
Print[" R wlinex w=", s20 / IT];
```