Collected papers
of

Lord Soumadeep Ghosh

Volume 6

The mathematics of bribery

Soumadeep Ghosh

Kolkata, India

Abstract

Introduction

Many individuals want to know the mathematics of bribery. In this paper, I describe the mathematics of bribery.

The mathematics of bribery

The mathematics of bribery is

$$P - b = \frac{Q + b}{1 + r_f + b}$$

where
P is the principal of the briber
Q is the principal of the taker
r_f is the risk-free rate
b is the bribe

The two solutions to the mathematics of bribery

The two solutions to the mathematics of bribery are

1. $$b = \frac{1}{2}(-\sqrt{2Pr_f + r_f^2 + 4r_f + P^2 - 4Q + 4} - r_f + P - 2)$$

2. $$b = \frac{1}{2}(\sqrt{2Pr_f + r_f^2 + 4r_f + P^2 - 4Q + 4} - r_f + P - 2)$$

The End

The Barricade probability density function

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the Barricade probability density function f(x) which is never 1 for any real x. The paper ends with "The End"

Introduction

It is often desired to have a probability density function which is never 1 for any real x. In this paper, I describe the Barricade probability density function f(x) which is never 1 for any real x.

The Barricade probability density function

Define

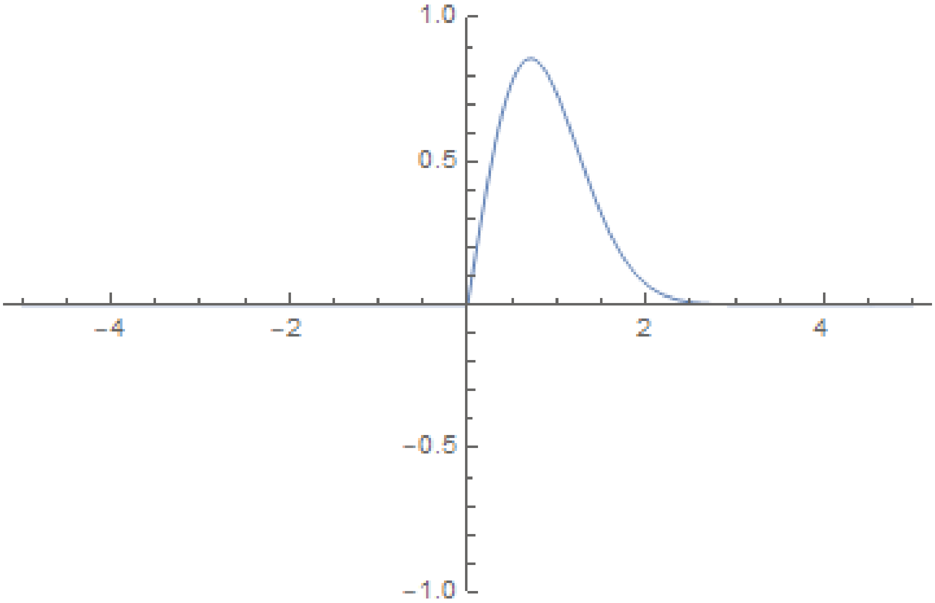
$$f(x) = \begin{cases} 2\exp\left(-x^2\right)|x| & x \geq 0 \\ 0 & x < 0 \end{cases}$$

Then

1. $0 \leq f(x) < 1$ for all real x.
2. $\int_{-\infty}^{\infty} f(x)dx = 1$

Thus $f(x)$ is a probability density function which is never 1 for any real x

Plot of the Barricade probability density function



The End

Politically, India is already at war

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe how politically, India is already at war as of this writing. The paper ends with "The End"

Introduction

In a previous paper, I've described how Narendra Damodardas Modi's TREASON has led to death squads looking to execute members of the Bharatiya Janta Party.

In another previous paper, I've described how Yogesh Varshney of the Bharatiya Janta Party has announced a 11 Lakh Rupees reward for the severed head of Mamata Banerjee. As of this writing the reward has been increased to 1 Crore Rupees - a fact verifiable at `https://www.youtube.com/watch?v=a2taNFnFydE`

In this paper, I describe how politically, India is already at war.

Politically, India is already at war

India not only faces an **external war** against China in the near future but is, in fact, facing an **internal war** as of this writing.

This internal war in India is that of the Bharatiya Janta Party versus the remaining political parties in the form of the opposition in the parliament.

It is difficult to say who holds more sway over the minds of the people of India for the upcoming elections. Therefore, I focus my discussion to the four major sides in the parliament as of this writing:

1. The **Indian National Congress** is embodied through the proverbial dynastic leader Rahul Gandhi who has been accused of not doing enough to prevent the situation India faces from arising in the first place, since the Indian National Congress held the majority in parliament in the past.

2. The **Bharatiya Janta Party** is embodied through the proverbial strongman Narendra Damodardas Modi whose motives are highly suspect as he has already been accused of **TREASON** by the opposition.

3. The **Trinamool Congress** is embodied through the proverbial mother Mamata Banerjee on whom there exists a large reward for capture as mentioned above.

4. The **Remaining Opposition** consists of smaller parties like the Communist Parties of India and the Dravidian Parties, who are surely looking for opportunities to capitalize on the outcome of this internal war.

The battle-lines have been drawn

Thus, we see the battle lines have been drawn for an internal war to be fought alongside the external war.

The End

The Block probability density function

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the Block probability density function $f(x)$. The paper ends with "The End"

Introduction

In this paper, I describe the Block probability density function $f(x)$

The Block probability density function

Define

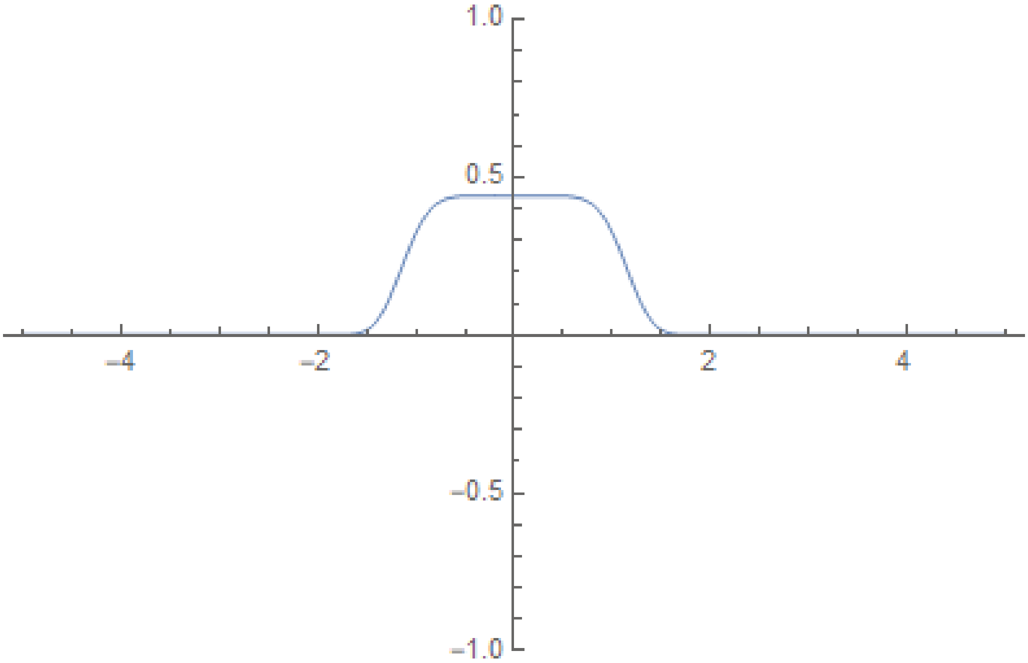
$$f(x) = \frac{2e^{-x^4}(1+x^4)}{5\Gamma\frac{5}{4}}$$

where
$\Gamma(x) = \int_0^\infty e^{-t}t^{x-1}dt$ is the Euler gamma function.
Then

1. $0 \leq f(x) \leq 1$
2. $\int_{-\infty}^{\infty} f(x)dx = 1$

Thus $f(x)$ is a probability density function.

Plot of the Block probability density function



The End

Ghosh's orthogonal matrices

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe my orthogonal matrices. The paper ends with "The End"

Introduction

Orthogonal matrices find use in several fields including economics, finance, communication and quantum computing. In this paper, I describe my orthogonal matrices.

Ghosh's orthogonal matrices

My orthogonal matrices are given by

$$A = \left[\begin{array}{cc} e^a & ln(b) \\ ln(c) & e^d \end{array} \right]$$

where

a, b, c, d are specific reals described below.

As of this writing, there are only 6 tuples $< a, b, c, d >$ known that satisfy the condition of orthogonality, i.e., $A^T = A^{-1}$

The 6 known tuples

The 6 known tuples are

1. $< 0, 1, 1, 0 >$
2. $< -18, e^{-\frac{\sqrt{e^{36}-1}}{e^{18}}}, e^{\frac{\sqrt{e^{36}-1}}{e^{18}}}, 18 + ln(-\frac{(1-\frac{1}{e^{36}})^{3/2} - \sqrt{1-\frac{1}{e^{36}}}}{\sqrt{1-\frac{1}{e^{36}}}}) >$
3. $< -55, e^{\frac{\sqrt{e^{110}-1}}{e^{55}}}, e^{-\frac{\sqrt{e^{110}-1}}{e^{55}}}, 55 + ln(\frac{\sqrt{1-\frac{1}{e^{110}}} - (1-\frac{1}{e^{110}})^{3/2}}{\sqrt{1-\frac{1}{e^{110}}}}) >$
4. $< -57, e^{-\frac{\sqrt{e^{114}-1}}{e^{57}}}, e^{\frac{\sqrt{e^{114}-1}}{e^{57}}}, 57 + ln(-\frac{(1-\frac{1}{e^{114}})^{3/2} - \sqrt{1-\frac{1}{e^{114}}}}{\sqrt{1-\frac{1}{e^{114}}}}) >$
5. $< -72, e^{-\frac{\sqrt{e^{144}-1}}{e^{72}}}, e^{\frac{\sqrt{e^{144}-1}}{e^{72}}}, 72 + ln(-\frac{(1-\frac{1}{e^{144}})^{3/2} - \sqrt{1-\frac{1}{e^{144}}}}{\sqrt{1-\frac{1}{e^{144}}}}) >$
6. $< -127, e^{-\frac{\sqrt{e^{254}-1}}{e^{127}}}, e^{\frac{\sqrt{e^{254}-1}}{e^{127}}}, 127 + ln(-\frac{(1-\frac{1}{e^{254}})^{3/2} - \sqrt{1-\frac{1}{e^{254}}}}{\sqrt{1-\frac{1}{e^{254}}}}) >$

The End

The Warhead probability density function

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the Warhead probability density function $f(x)$. The paper ends with "The End"

Introduction

In this paper, I describe the Warhead probability density function $f(x)$

The Warhead probability density function

Define

$$f(x) = \begin{matrix} \frac{27x^4}{40} - \frac{7x^2}{6} + 1 & -\alpha \leq x \leq \alpha \\ 0 & x < -\alpha \vee x > \alpha \end{matrix}$$

where
α is the positive real root of the quintic

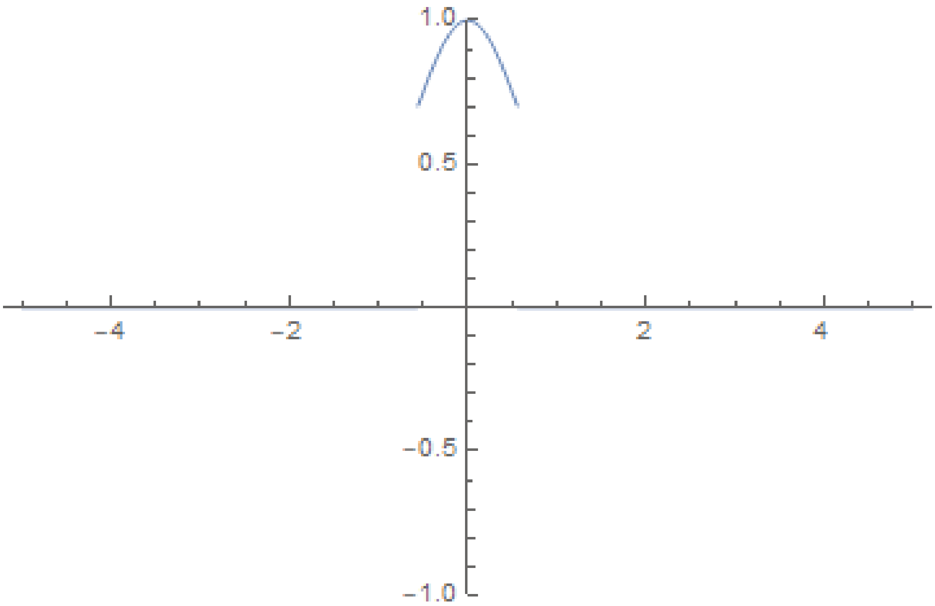
$$243t^5 - 700t^3 + 1800t - 900 = 0$$

approximately 0.56122889.
Then

1. $0 \leq f(x) \leq 1$
2. $\int_{-\infty}^{\infty} f(x)dx = 1$

Thus $f(x)$ is a probability density function.

Plot of the Warhead probability density function



The End

The Elite probability density function

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the Elite probability density function $f(x)$. The paper ends with "The End"

Introduction

It is often desired to have a probability density function $f(x)$ which is 1 at $x = 0$ but isn't the normal density function.

In this paper, I describe the Elite probability density function $f(x)$.

The Elite probability density function

Define

$$f(x) = \begin{cases} 1 - \frac{x^2}{4\pi} + \frac{x^4}{64\pi} & -\alpha \leq x \leq \alpha \\ 0 & x < -\alpha \vee x > \alpha \end{cases}$$

where
α is the positive real root of the quintic

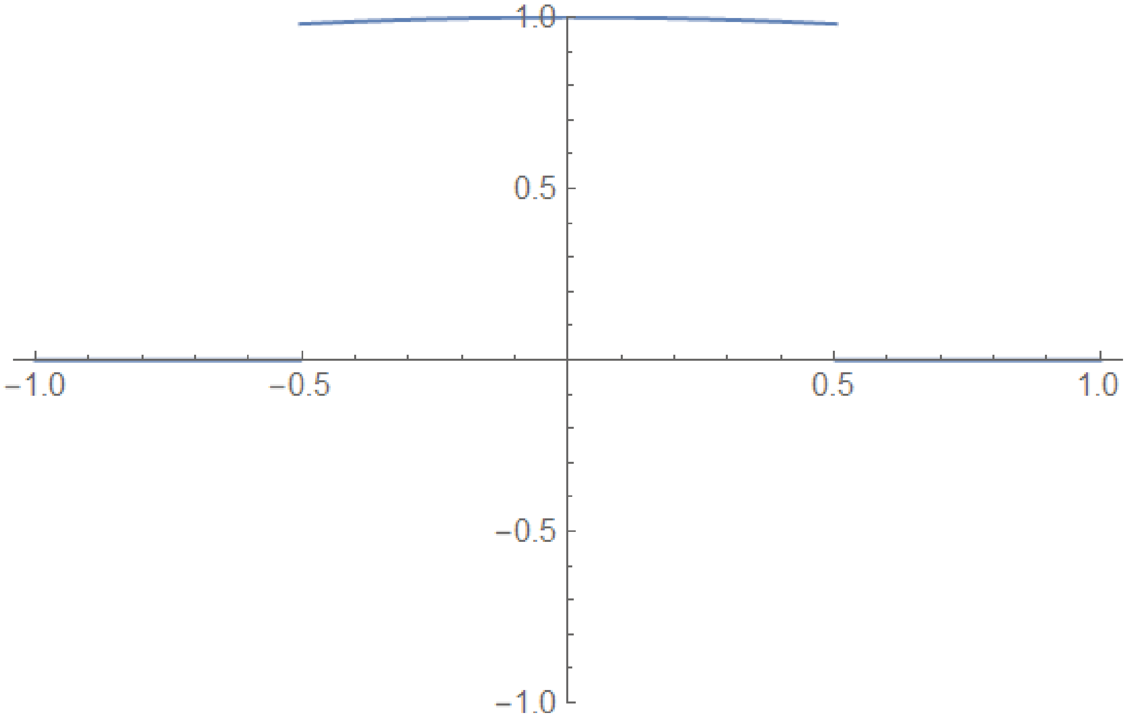
$$3a(a^4 + 320\pi) = 80(a^3 + 6\pi)$$

approximately 0.50335070.
Then

1. $0 \leq f(x) \leq 1$
2. $\int_{-\infty}^{\infty} f(x)dx = 1$

Thus $f(x)$ is a probability density function.

Plot of the Elite probability density function



The End

14 default constant solutions to the warfare economist's problem

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe 14 default constant solutions to the warfare economist's problem. The paper ends with "The End"

Introduction

In a previous paper, I've described the warfare economist's problem. In this paper, I describe 14 default constant solutions to the warfare economist's problem. These solutions are to be used **only** as a **last resort** because more preferable solutions **can** and **should** be found.

14 default constant solutions to the warfare economist's problem

The 14 default constant solutions to the warfare economist's problem are

1. $$r_f = -\frac{346}{5}, p_w = \frac{341}{5}, L = -34, C = 136$$

2. $$r_f = -\frac{487}{10}, p_w = \frac{487}{10}, L = 0, C = -46$$

3. $$r_f = -\frac{451}{10}, p_w = \frac{451}{10}, L = 0, C = 41$$

4. $$r_f = -\frac{311}{10}, p_w = \frac{301}{10}, L = -22, C = 88$$

5. $$r_f = -\frac{307}{10}, p_w = 33, L = 41, C = \frac{16400}{989}$$

6. $$r_f = -\frac{76}{5}, p_w = \frac{1469}{102}, L = -76, C = \frac{79070400}{249491}$$

7. $$r_f = -\frac{76}{5}, p_w = 68, L = 66, C = \frac{25}{274}$$

8.
$$r_f = -\frac{127}{10}, p_w = \frac{127}{10}, L = 0, C = 56$$

9.
$$r_f = \frac{25}{2}, p_w = 5, L = -34, C = -\frac{544}{1365}$$

10.
$$r_f = \frac{138}{5}, p_w = -\frac{143}{5}, L = -67, C = 268$$

11.
$$r_f = \frac{115}{2}, p_w = -\frac{117}{2}, L = 82, C = -328$$

12.
$$r_f = \frac{313}{5}, p_w = -\frac{318}{5}, L = 33, C = -132$$

13.
$$r_f = \frac{338}{5}, p_w = -\frac{343}{5}, L = 7, C = -28$$

14.
$$r_f = \frac{338}{5}, p_w = -\frac{3490}{51}, L = 18, C = -\frac{585225}{7897}$$

The End

2 better solutions to the warfare economist's problem

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe 2 better solutions to the warfare economist's problem. The paper ends with "The End"

Introduction

In a previous paper, I've described the warfare economist's problem. In a previous paper, I've described 14 default constant solutions to the warfare economist's problem. In this paper, I describe 2 better solutions to the welfare economist's problem.

The POLITMN solution

The **POLITMN** solution is given by

$$r_f(t) = mt^2 + nt + o$$

$$p_w(t) = Pe^t$$

$$L(t) = \frac{l}{1 + e^{-t}}$$

$$C(t) = isinc(t)$$

where

$$P = \frac{\sqrt{\frac{esinc(1)+sinc(1)+4e}{(1+e)sinc(1)}}}{e} \quad o = 0 \quad l = 1 \quad i = 1 \quad t = 1 \quad m = -1 \quad n = 0$$

The POLITB solution

The **POLITB** solution is given by

$$r_f(t) = BJ_o(t)$$

$$p_w(t) = Pe^t$$

$$L(t) = \frac{l}{1+e^{-t}}$$

$$C(t) = i(1+e^{-t})$$

where
P, o, l, i, t, B are specific reals
$J_o(t)$ is the Bessel function of the first kind of order o
There exist 14 POLITB solutions given below

1. $P = \frac{-5472J_{-\frac{23}{5}}(91)+\frac{\sqrt{57(57+114e^{91}+173e^{182})}}{1+e^{91}}-57}{57e^{91}}, o = -\frac{23}{5}, l = 29, i = 57, t = 91, B = 96$
2. $P = \frac{-623J_{-\frac{19}{5}}(91)+\frac{\sqrt{7(7+14e^{91}+139e^{182})}}{1+e^{91}}-7}{7e^{91}}, o = -\frac{19}{5}, l = 33, i = 7, t = 91, B = 89$
3. $P = \frac{-4940J_{-\frac{37}{10}}(74)+\frac{\sqrt{65(65+130e^{74}+233e^{148})}}{1+e^{74}}-65}{65e^{74}}, o = -\frac{37}{10}, l = 42, i = 65, t = 74, B = 76$
4. $P = \frac{3705J_{-\frac{21}{10}}(87)+\frac{\sqrt{65(65+130e^{87}+253e^{174})}}{1+e^{87}}-65}{65e^{87}}, o = -\frac{21}{10}, l = 47, i = 65, t = 87, B = -57$
5. $P = \frac{21J_{-\frac{9}{10}}(98)+\frac{\sqrt{49+98e^{98}+353e^{196}}}{1+e^{98}}-7}{7e^{98}}, o = -\frac{9}{10}, l = 76, i = 49, t = 98, B = -3$
6. $P = \frac{195J_{-\frac{1}{10}}(70)+\frac{\sqrt{3(3+6e^{70}+7e^{140})}}{1+e^{70}}-3}{3e^{70}}, o = -\frac{1}{10}, l = 19, i = 57, t = 70, B = -65$
7. $P = \frac{1155J_{\frac{3}{5}}(66)+\frac{\sqrt{55(55+110e^{66}+347e^{132})}}{1+e^{66}}-55}{55e^{66}}, o = \frac{3}{5}, l = 73, i = 55, t = 66, B = -21$

8. $P = \frac{-119J_1(22)+\frac{\sqrt{7(7+14e^{22}+199e^{44})}}{1+e^{22}}-7}{7e^{22}}, o = 1, l = 96, i = 14, t = 22, B = 17$

9. $P = \frac{264J_{\frac{6}{5}}(42)+\frac{\sqrt{11(11+22e^{42}+47e^{84})}}{1+e^{42}}-11}{11e^{42}}, o = \frac{6}{5}, l = 54, i = 66, t = 42, B = -24$

10. $P = \frac{1702J_{\frac{7}{5}}(16)+\frac{\sqrt{37(37+74e^{16}+249e^{32})}}{1+e^{16}}-37}{37e^{16}}, o = \frac{7}{5}, l = 53, i = 37, t = 16, B = -46$

11. $P = \frac{-285J_{\frac{17}{10}}(95)+\frac{\sqrt{5(5+10e^{95}+21e^{190})}}{1+e^{95}}-5}{5e^{95}}, o = \frac{17}{10}, l = 20, i = 25, t = 95, B = 57$

12. $P = \frac{2J_{\frac{14}{5}}(2)+\frac{\sqrt{1+2e^{2}+3e^{4}}}{1+e^{2}}-1}{e^{2}}, o = \frac{14}{5}, l = 47, i = 94, t = 2, B = -2$

13. $P = \frac{-90J_{\frac{23}{5}}(12)+\frac{\sqrt{3(27+54e^{12}+97e^{24})}}{1+e^{12}}-9}{9e^{12}}, o = \frac{23}{5}, l = 35, i = 54, t = 12, B = 10$

14. $P = \frac{72J_{\frac{49}{10}}(1)+\frac{\sqrt{6(24+48e+65e^{2})}}{1+e}-12}{12e}, o = \frac{49}{10}, l = 41, i = 96, t = 1, B = -6$

The End

A Legendre solution to the warfare economist's problem

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe a Legendre solution to the warfare economist's problem. The paper ends with "The End"

Introduction

In a previous paper, I've described the warfare economist's problem. In a previous paper, I've described 14 default constant solutions to the warfare economist's problem. In this paper, I describe a Legendre solution to the welfare economist's problem.

The Legendre/POLITR solution

The **POLITR** solution is given by

$$r_f(t) = RQ_o(t)$$

$$p_w(t) = Pe^t$$

$$L(t) = \frac{l}{1+e^{-t}}$$

$$C(t) = iP_o(t)$$

where
$P_o(t)$ is the Legendre polynomial of order o
$Q_o(t)$ is the Legendre function of the second kind of order o

$$P = \frac{\frac{16}{\sqrt{\frac{(1+\sqrt[16]{e})P_{\frac{1}{16}}(\frac{1}{16})}{\sqrt[16]{e}P_{\frac{1}{16}}(\frac{1}{16})+P_{\frac{1}{16}}(\frac{1}{16})+4\sqrt[16]{e}}}} - Q_{\frac{1}{16}}(\frac{1}{16}) - 16}{16\sqrt[16]{e}}$$

$$o = \frac{1}{16}$$
$$l = \frac{1}{16}$$
$$i = \frac{1}{16}$$
$$t = \frac{1}{16}$$
$$R = \frac{1}{16}$$

The End

A probabilistic solution to the warfare economist's problem

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe a probabilistic solution to the warfare economist's problem. The paper ends with "The End"

Introduction

In a previous paper, I've described the warfare economist's problem. In a previous paper, I've described 14 default constant solutions to the warfare economist's problem. In this paper, I describe a probabilistic solution to the welfare economist's problem.

The probabilistic/RPLIMTS solution

The **RPLIMTS** solution is given by

$$r_f(t) = R\frac{e^{\frac{-(t-m)^2}{2s^2}}}{\sqrt{2\pi}s}$$

$$p_w(t) = Pe^t$$

$$L(t) = \frac{l}{1+e^{-t}}$$

$$C(t) = i\frac{e^{\frac{-(t-m)^2}{2s^2}}}{\sqrt{2\pi}s}$$

where
R, P, l, i, m, t, s are specific reals
There exist 14 RPLIMTS solutions given on the next page

1. $R = \frac{17e^{192721/924800}\sqrt{\pi}(\sqrt{\frac{51e^{192721/924800}\sqrt{2\pi}}{1+\frac{1}{e^{21/8}}}+1}-\frac{8145e^{21/8}}{16}-1)}{2\sqrt{2}}, P = \frac{8145}{16}, l = \frac{3}{16}, i = \frac{1}{16}, m = -\frac{19}{160}, t = \frac{21}{8}, s = \frac{17}{4}$

2. $R = -\frac{1}{17}e^{17672/225}\sqrt{\frac{\pi}{2}}(6\sqrt{\frac{17(12000e^{25772/225}\sqrt{2\pi}+17e^{36}+17)}{1+e^{36}}} - 682074e^{36} - 102), P = 6687, l = 100, i = -\frac{17}{10}, m = -\frac{8}{5}, t = 36, s = -3$

3. $R = \frac{e^{169/24200}\sqrt{\pi}(66\sqrt{\frac{17(54120e^{24369/24200}\sqrt{2\pi}+17e+17)}{1+e}}-12142284e-1122)}{17\sqrt{2}}, P = 10822, l = 41, i = \frac{17}{10}, m = \frac{49}{10}, t = 1, s = 33$

4. $R = -\frac{1}{7}e^{3249/200}\sqrt{\frac{\pi}{2}}(26\sqrt{\frac{7800e^{17449/200}\sqrt{2\pi}+49e^{71}+49}{1+e^{71}}}-2110290e^{71}-182), P = 11595, l = 15, i = -\frac{49}{10}, m = -\frac{31}{10}, t = 71, s = -13$

5. $R = -\frac{1}{11}e^{4761/3200}\sqrt{\frac{\pi}{2}}(24\sqrt{\frac{11(19920e^{75161/3200}\sqrt{2\pi}+11e^{22}+11)}{1+e^{22}}} - 3369696e^{22} - 264), P = 12764, l = 83, i = -\frac{11}{5}, m = \frac{13}{10}, t = 22, s = -12$

6. $R = -\frac{1}{3}e^{38809/800}\sqrt{\frac{\pi}{2}}(8\sqrt{\frac{320e^{72409/800}\sqrt{2\pi}+9e^{42}+9}{1+e^{42}}}-97080e^{42}-24), P = 4045, l = 8, i = -\frac{18}{5}, m = \frac{13}{5}, t = 42, s = -4$

7. $R = -e^{2809/3200}\sqrt{\frac{\pi}{2}}(104\sqrt{\frac{3445e^{217209/3200}\sqrt{2\pi}+e^{67}+1}{1+e^{67}}}-1225224e^{67}-104), P = 11781, l = 53, i = -\frac{16}{5}, m = -\frac{19}{10}, t = 67, s = -52$

8. $R = \frac{e^{9/8450}\sqrt{\pi}(156\sqrt{\frac{41(184080e^{25359/8450}\sqrt{2\pi}+41e^{3}+41)}{1+e^{3}}}-5730816e^{3}-6396)}{41\sqrt{2}}, P = 896, l = 59, i = \frac{41}{10}, m = -\frac{3}{5}, t = 3, s = 78$

9. $R = -\frac{1}{43}e^{2025/722}\sqrt{\frac{\pi}{2}}(38\sqrt{\frac{43(28880e^{30905/722}\sqrt{2\pi}+43e^{40}+43)}{1+e^{40}}} - 3143816e^{40} - 1634), P = 1924, l = 38, i = -\frac{43}{10}, m = -5, t = 40, s = -19$

10. $R = -\frac{e^{3721/84050}\sqrt{\pi}(82\sqrt{\frac{11(54940e^{676121/84050}\sqrt{2\pi}+11e^{8}+11)}{1+e^{8}}}-8433700e^{8}-902)}{11\sqrt{2}}, P = 9350, l = 67, i = -\frac{11}{5}, m = -\frac{21}{5}, t = 8, s = -41$

11. $R = -\frac{1}{7}e^{7921/10952}\sqrt{\frac{\pi}{2}}(148\sqrt{\frac{7(29600e^{1015505/10952}\sqrt{2\pi}+7e^{92}+7)}{1+e^{92}}} - 451696e^{92} - 1036), P = 436, l = 70, i = -\frac{49}{10}, m = 3, t = 92, s = -74$

12. $R = -e^{19321/8450}\sqrt{\frac{\pi}{2}}(26\sqrt{\frac{2236e^{272821/8450}\sqrt{2\pi}+e^{30}+1}{1+e^{30}}} - 208936e^{30} - 26), P = 8036, l = 43, i = -1, m = \frac{11}{5}, t = 30, s = -13$

13. $R = -\frac{e^{4761/10952}\sqrt{\pi}(74\sqrt{\frac{3(1480e^{333321/10952}\sqrt{2\pi}+3e^{30}+3)}{1+e^{30}}}-1068708e^{30}-222)}{3\sqrt{2}}, P = 4814, l = 2, i = -\frac{3}{5}, m = -\frac{9}{2}, t = 30, s = -37$

14. $R = -\frac{e^{7921/16200}\sqrt{\pi}(36\sqrt{\frac{1728e^{218521/16200}\sqrt{2\pi}+e^{13}+1}{1+e^{13}}}-500328e^{13}-36)}{\sqrt{2}}, P = 13898, l = 48, i = -2, m = -\frac{24}{5}, t = 13, s = -18$

The End

2 non-standard probability density functions invented using a computer algebra system

Soumadeep Ghosh

Kolkata, India

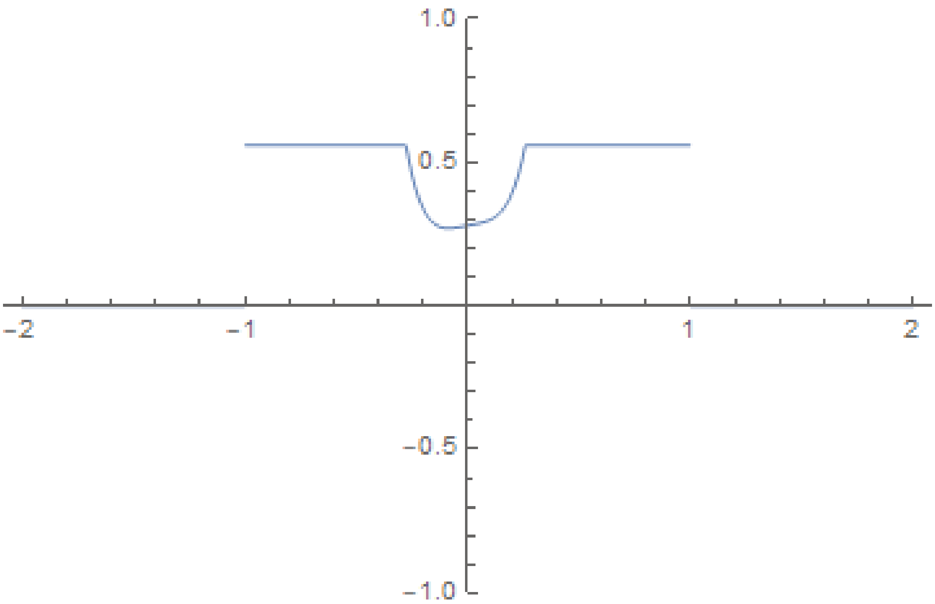
Abstract

In this paper, I describe 2 non-standard probability density functions invented using a computer algebra system. The paper ends with "The End"

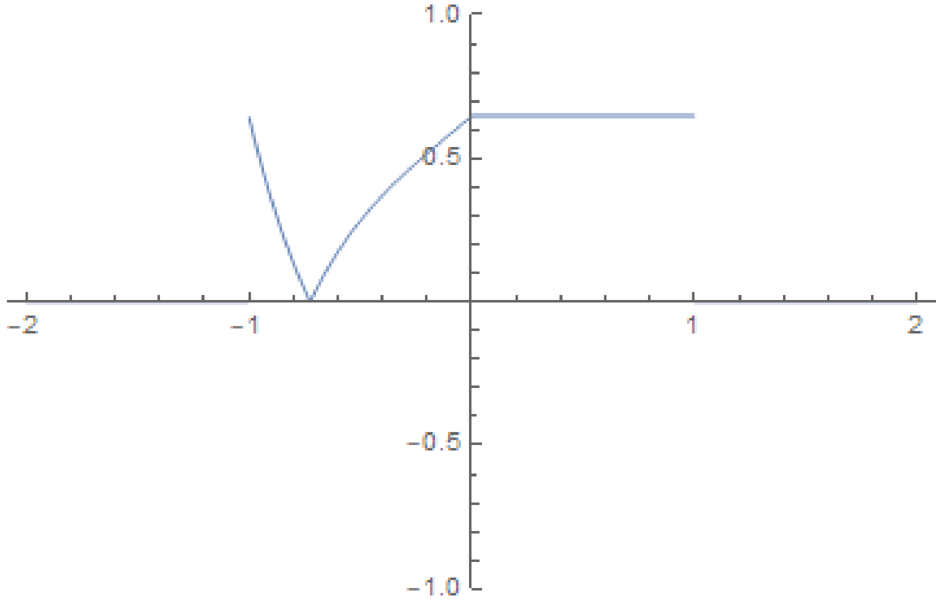
Introduction

It is possible to invent non-standard probability density functions using a computer algebra system. In this paper, I describe 2 non-standard probability density functions invented using a computer algebra system like Mathematica.

The inverted hat probability density function



The root sign probability density function



Mathematica notebook

The Mathematica notebook with the code of these 2 non-standard probability density functions is available on request.

The End

Weapons of the nuclear age

Soumadeep Ghosh

Kolkata, India

In this paper, I describe weapons of the nuclear age. The paper ends with "The End"

Introduction

The nuclear age enables the production and possible use of weapons of mass destruction. In this paper, I describe weapons of the nuclear age.

Weapons of the nuclear age

1. **Nuclear fission bomb**
   A nuclear bomb that uses fission reactions of high-mass nucliotides to cause destruction.

2. **Nuclear fusion bomb**
   A nuclear bomb that uses fusion reactions of low-mass and medium-mass nucliotides to cause destruction.

3. **Tactical nuclear bomb**
   A miniaturized nuclear bomb that trades off size and yield for portability.

4. **Gravity bomb**
   A nuclear bomb that uses gravitons to produce localized gravity.

5. **Strangelet bomb**
   A nuclear bomb that uses strangelets to cause destruction.

The End

The warlord's calculus

Soumadeep Ghosh

Kolkata, India

In this paper, I describe the warlord's calculus. The paper ends with "The End"

Introduction

Knowledge has been demanded of me of the warlord's calculus. In this paper, I describe the warlord's calculus.

Basic concepts and equations

1. The war begins at $t = 0$ and ends at $t = T$
2. There exists at least one point in time $0 < t = d < T$ for diplomacy.
3. $A_C(t)$ denotes **area under contention** at time t.
4. $A_{Co}(t)$ denotes **area under control** at time t.
5. $A_O(t)$ denotes **area under occupation** at time t.
6. We have the **areas equation**
$$A_C(t) = A_{Co}(t) + A_O(t)$$
7. $S_T(t)$ denotes **soldiers trained** by time t.
8. $S_O(t)$ denotes **soldiers occupying their posts** at time t.
9. $S_R(t)$ denotes **soldiers in reserve** at time t.
10. We have the **soldiers equation**
$$S_T(t) = S_O(t) + S_R(t)$$
11. **Gain** at time t is defined by
$$G(t) = \frac{A_{Co}(t) - A_{Co}(0)}{S_T(0) - S_T(t)}$$

Transformation of gain using the areas and the soldiers equations

We re-write

$$G(t) = \frac{A_C(t) - A_O(t) - A_C(0) + A_O(0)}{S_T(0) - S_O(t) - S_R(t)}$$

The warlord's objective

The warlord's objective is

$$G(t) > 0$$

for as many values of t as possible.

The time(s) for diplomacy

The time(s) for diplomacy are given by the solution(s) $t = d$ to

$$G(t) = 0$$

The End

A simple solution to the warlord's calculus

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe a simple solution to the warlord's calculus.

Introduction

In a previous paper, I've described the warlord's calculus. In this paper, I describe a simple solution to the warlord's calculus.

A simple solution to the warlord's calculus

A simple solution to the warlord's calculus is given by

$$A_C(t) = c\sigma(t)$$

$$A_O(t) = o(1 - \sigma(t))$$

$$S_T(t) = Te^t$$

$$S_O(t) = se^t$$

$$S_R(t) = S_T(t) - S_O(t)$$

where
c, o, T, s are specific reals
$\sigma(t)$ is the logistic sigmoid function

The End

14 simple solutions to the warlord's calculus

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe 14 simple solutions to the warlord's calculus.

Introduction

In a previous paper, I've described the warlord's calculus. In a previous paper, I've described a simple solution to the warlord's calculus. In this paper, I describe 14 simple solutions to the warlord's calculus.

14 simple solutions to the warlord's calculus

1. $c = 9, o = -102, T = 18, s = 92, t = -\frac{24}{5}$
2. $c = 48, o = -115, T = 21, s = 70, t = -\frac{1}{5}$
3. $c = 360, o = -439, T = 68, s = 94, t = -\frac{19}{10}$
4. $c = 390, o = -472, T = 40, s = 20, t = \frac{9}{5}$
5. $c = 549, o = -630, T = 22, s = 9, t = -\frac{31}{10}$
6. $c = 603, o = -615, T = 59, s = 35, t = \frac{22}{5}$
7. $c = 782, o = -843, T = 32, s = 9, t = \frac{3}{5}$
8. $c = 930, o = -936, T = 43, s = 3, t = \frac{24}{5}$
9. $c = 977, o = -981, T = 26, s = 33, t = 3$
10. $c = 1007, o = -1037, T = 80, s = 39, t = \frac{39}{10}$
11. $c = 1039, o = -1126, T = 38, s = 23, t = -\frac{33}{10}$
12. $c = 1062, o = -1073, T = 56, s = 21, t = \frac{16}{5}$
13. $c = 1218, o = -1274, T = 52, s = 26, t = \frac{29}{10}$
14. $c = 1247, o = -1329, T = 93, s = 20, t = \frac{29}{10}$

The End

NIFTY50 is underpriced

Soumadeep Ghosh

Kolkata, India

In this paper, I describe how the NIFTY50 index is underpriced. The paper ends with "The End"

Introduction

Numerical analysis of the NIFTY50 index shows that the NIFTY50 index is underpriced. In this paper, I describe how the NIFTY50 index is underpriced.

Pricing the NIFTY50 index

I fitted a numerical model of the form

$$y = \beta_0 + \beta_1 \Delta x + \beta_2 \Delta y + \beta_3 \Delta x^2 + \beta_4 \Delta^2 y + \beta_5 \frac{\Delta y}{\Delta x} + \beta_6 \frac{\Delta^2 y}{\Delta x^2}$$

where
x is date
y is the closing price of NIFTY50 index
which gives

$$\beta_0 = 17517.20$$

with a standard error of 576.93
and a t-statistic of 30.36
at a 95% confidence level
and an $R^2 = 1.77\%$
As of this writing, NIFTY50 closed at 16245.35.
Thus, the NIFTY50 index is underpriced.

Reference

The numerical model is available as a LibreOffice spreadsheet at `https://cutt.ly/bAkqT8z`

The End

The oliGARCH model of an individual's wealth

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the oliGARCH model of an individual's wealth. The paper ends with "The End"

Introduction

The **ordinary linear generalized auto-regressive with conditional heteroskedasticity** (oliGARCH) model of an individual's wealth is a robust mndel of an individual's wealth. In this paper, I describe the oliGARCH model of an individual's wealth.

The oliGARCH model

The oliGARCH model is given by the differential equation

$$a\frac{\partial W(t)}{\partial t} + bW(t) + ct + d + e\frac{\exp(-\frac{(x-\mu)^2}{2\sigma^2})}{\sqrt{2\pi}\sigma} = 0$$

where
$W(t)$ is wealth of the individual as a function of time
a, b, c, d, e are specific reals
t is time
x is any variable independent of time
$exp(x)$ is the exponential function

A solution to the oliGARCH model

A solution to the oliGARCH model is given by

$$W(t) = \frac{2ac\sigma - 2b\sigma(ct+d) - \sqrt{\frac{2}{\pi}}be\exp(-\frac{(x-\mu)^2}{2\sigma^2})}{2b^2\sigma} + fexp(-\frac{bt}{a})$$

where f is an arbitrary constant of integration

The End

There are exactly 729 different oliGARCHes

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe why there are exactly 729 different oliGARCHes. The paper ends with "The End"

Introduction

In a previous paper, I've described the oliGARCH model of an individual's wealth. The question that naturally comes up now is - how many oliGARCHes are there?

There are exactly 729 different oliGARCHes

As there are exactly 6 coefficients in the solution to the oliGARCH model and each of them can take only one of 3 possible signs - positive, negative or zero - there are exactly $3^6 = 729$ different oliGARCHes.

The End

A result on the distribution of oliGARCHes in an economy

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe a result on the distribution of oliGARCHes in an economy. The paper ends with "The End"

Introduction

In a previous paper, I've described why there are exactly 14 sub-economies in an economy. In a previous paper, I've described the oliGARCH model of an individual's wealth. In a previous paper, I've described why there are exactly 729 different oliGARCHes. In this paper, I describe a result on the distribution of oliGARCHes in an economy.

A result on the distribution of oliGARCHes in an economy

We concern ourselves with the equation

$$o_1 + o_2 + o_3 + ... + o_{13} + o_{14} = 729$$

where o_i is the number of oliGARCHes in the i^{th} sub-economy

The number of solutions to this linear Diophantine equation is exactly

$$^{(729+14-1)}C_{(14-1)} =^{742} C_{13}$$

Thus, the number of oliGARCHes can be distributed in the economy in exactly 30389549665295896754977277868 different ways.

The End

The oliGAT model of time's wealth

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the oliGAT model of time's wealth. The paper ends with "The End"

Introduction

The **ordinary linear generalized auto-regressive time** (oliGAT) model of time's wealth is a robust mndel of time's wealth. In this paper, I describe the oliGAT model of time's wealth.

The oliGAT model

The oliGAT model is given by the differential equation

$$a\frac{\partial W(t)}{\partial t} + bW(t) + ct + d + e\frac{\exp(-\frac{(t-\mu)^2}{2\sigma^2})}{\sqrt{2\pi}\sigma} = 0$$

where
$W(t)$ is wealth of time as a function of time
a, b, c, d, e are specific reals
t is time
$exp(x)$ is the exponential function

A solution to the oliGAT model

A solution to the oliGAT model is given by

$$W(t) = \frac{exp(\frac{b\mu}{a} - \frac{bt}{a})(2aexp(\frac{b(t-\mu)}{a})(ac - b(ct+d)) - b^2eexp(\frac{b^2\sigma^2}{2a^2})erf(\frac{a(t-\mu)-b\sigma^2}{\sqrt{2}a\sigma}))}{2ab^2} + fexp(-\frac{bt}{a})$$

where
f is an arbitrary constant of integration
$erf(x) = \frac{2}{\sqrt{\pi}}\int_0^x e^{-t^2}dt$ is the error function

The End

There is exactly 1 time

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe why there is exactly 1 time. The paper ends with "The End"

Introduction

In a previous paper, I've described the oliGAT model of time's wealth. The question that naturally comes up now is - how many times are there?

There is exactly 1 time

As the oliGAT model has time t as a variable in the normal distribution function and can take only 1 of 3 possible signs - positive, negative or zero - there is exactly 1 time.

The End

A result on the distribution of time in an economy

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe a result on the distribution of time in an economy. The paper ends with "The End"

Introduction

In a previous paper, I've described why there are exactly 14 sub-economies in an economy. In a previous paper, I've described the oliGAT model of time's wealth. In a previous paper, I've described why there is exactly 1 time. In this paper, I describe a result on the distribution of time in an economy.

A result on the distribution of time in an economy

We concern ourselves with the equation

$$t_1 + t_2 + t_3 + ... + t_{13} + t_{14} = 1$$

where t_i is 1 if time in the i^{th} sub-economy and 0 if not.
The number of solutions to this linear Diophantine equation is exactly

$$^{(1+14-1)}C_{(14-1)} =^{14} C_{13}$$

Thus, time can be distributed in the economy in exactly 14 different ways.

The End

Accounting in an oliGARCHy using identical oliGARCHes, numenaire and money

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe accounting in an oliGARCHy using identical oliGARCHes, numenaire and money. The paper ends with "The End"

Introduction

In a previous paper, I've described the oliGARCH model of an individual's wealth. In a previous paper, I've described how there are 729 oliGARCHes in the economy. Contrary to popular belief, accounting is possible in an oliGARCHy using identical oliGARCHes, numenaire and money. In this paper, I describe accounting in an oliGARCHy using identical oliGARCHes, numenaire and money.

Accounting in an oliGARCHy using identical oliGARCHes, numenaire and money

Recall the wealth of an individual in the oliGARCH model is

$$W(t) = \frac{2ac\sigma - 2b\sigma(ct+d) - \sqrt{\frac{2}{\pi}}be\exp(-\frac{(x-\mu)^2}{2\sigma^2})}{2b^2\sigma} + f\exp(-\frac{bt}{a})$$

To introduce accounting in an oliGARCHy, we simply find solutions to

$$nW(t) = \int_0^m W(t)dx$$

where
$n = 729$
x is the numenaire
m is money
$W(t)$ is the wealth of identical oliGARCHes

Real solutions to the equation

There exist at least 7 real solutions to the equation above, available upon request.

The End

Finance in an oliGARCHy using identical oliGARCHes, numenaire and risk-free rate

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe finance in an oliGARCHy using identical oliGARCHes, numenaire and risk-free rate. The paper ends with "The End"

Introduction

In a previous paper, I've described the oliGARCH model of an individual's wealth. In a previous paper, I've described how there are 729 oliGARCHes in the economy. In a previous paper, I've described accounting in an oliGARCHy using identical oliGARCHes, numenaire and money. Contrary to popular belief, finance is possible in an oliGARCHy using identical oliGARCHes, numenaire and risk-free rate. In this paper, I describe finance in an oliGARCHy using identical oliGARCHes, numenaire and risk-free rate.

Finance in an oliGARCHy using identical oliGARCHes, numenaire and risk-free rate

Recall the wealth of an individual in the oliGARCH model is

$$W(t) = \frac{2ac\sigma - 2b\sigma(ct+d) - \sqrt{\frac{2}{\pi}}be\exp(-\frac{(x-\mu)^2}{2\sigma^2})}{2b^2\sigma} + f\exp(-\frac{bt}{a})$$

After introduction of accounting, to introduce finance in an oliGARCHy, we simply find solutions to

$$\frac{W(t+1)}{W(t)} = 1 + r_f + p_w$$

where
x is the numenaire
$W(t)$ is the wealth of identical oliGARCHes at time t
r_f is the risk-free rate
p_w is the wealth premium

Real solutions to the equation

There exist at least 7 real solutions to the equation above, available upon request.

The End

Discounted oliGARCHy

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the discounted oliGARCHy using identical oliGARCHes, numenaire, money and discount rate. The paper ends with "The End"

Introduction

In a previous paper, I've described the oliGARCH model of an individual's wealth. In a previous paper, I've described how there are 729 oliGARCHes in the economy. Contrary to popular belief, a discounted oliGARCHy is possible using identical oliGARCHes, numenaire, money and discount rate. In this paper, I describe the discounted oliGARCHy using identical oliGARCHes, numenaire, money and discount rate.

The discounted oliGARCHy using identical oliGARCHes, numenaire, money and discount rate

Recall the wealth of an individual in the oliGARCH model is

$$W(t) = \frac{2ac\sigma - 2b\sigma(ct+d) - \sqrt{\frac{2}{\pi}}be\exp(-\frac{(x-\mu)^2}{2\sigma^2})}{2b^2\sigma} + f\exp(-\frac{bt}{a})$$

The discounted oliGARCHy is given by the equation

$$n(W(t) + \frac{W(t)}{1+r} + \frac{W(t)}{(1+r)^2}) = \int_0^m (W(t) + \frac{W(t)}{1+r} + \frac{W(t)}{(1+r)^2})dx$$

where
$n = \frac{729}{3} = 243$
x is the numenaire
m is money
$W(t)$ is the wealth of identical oliGARCHes at time t
r is the discount rate

Real solutions to the equation

There exist at least 7 real solutions to the equation above, available upon request.

The End