Collected papers of

Lord Soumadeep Ghosh

Volume 15

Effective modern guns

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Abstract

In this paper, I list effective modern guns that are found in the world. The paper ends with 'The End"

Introduction

There are a plethora of guns and gun designs in the world today, but not all of them satisfy the tripartite requirements of power, economy and deploy-ability in field mission. In this paper, I list effective modern guns that are found in the world.

Effective modern guns

1. **Pistol**

   Available with silencers, a pistol is useful for low visibility mission.

2. **Revolver**

   More powerful than a pistol, a revolver is useful for high visibility mission.

3. **Sub-machine gun**

   More powerful than a revolver, a sub-machine gun is useful for SWAT teams.

4. **Assault rifle**

   More powerful than a sub-machine gun but economical, an assault rifle is useful for general mission.

5. **Automatic shotgun**

   More powerful than an assault rifle but economical, an automatic shotgun is useful for home protection.

6. **Sniper rifle**

   More powerful than an assault rifle but economical, a sniper rifle is useful for field mission where longer range than an assault rifle is required.

7. **Gatling gun**

   Precursor to the heavy machine gun, a Gatling gun is more powerful than an assault rifle, economical, and useful for field mission.

8. **Heavy machine gun**

   More powerful than a Gatling gun but not economical, a heavy machine gun is useful for field mission.

9. **Howitzer**

   More powerful than a heavy machine gun but not economical, a howitzer is useful for field mission where heavy artillery isn't required.

10. **Heavy artillery**

    More powerful than a howitzer but economical, heavy artillery is useful for field missions where longer range than a howitzer is required.

The End

A commentary on the risk in Ukraine due to possible use of Russian nuclear weapons

Soumadeep Ghosh

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Abstract

In this paper, a provide a commentary on the risk in Ukraine due to possible use of Russian nuclear weapons. The paper ends with "The End"

Introduction

As of this writing, Russia has invaded Ukraine and there exists the possibility of use of Russian nuclear weapons on Ukrainian land. In this paper, a provide a commentary on the risk in Ukraine due to possible use of Russian nuclear weapons.

A commentary on the risk in Ukraine due to possible use of Russian nuclear weapons

In a previous paper, I've described capital impairment and nuclear deterrence.

Recall that the basis of nuclear deterrence is

$$\tau < \frac{b}{r} + \frac{\mathbf{E[D]}}{K} \leq 1$$

Rewriting the in-equation as

$$\tau + \delta = \frac{b}{r} + \frac{\mathbf{E[D]}}{K} = 1 - \epsilon$$

where
$0 \leq \delta$ is a threshold term
and
$0 \leq \epsilon \leq 1$ is an error term
enables the estimation of $\mathbf{E[D]}$
The equation

$$\frac{G}{1 + r_f + p_n} = \mathbf{E[D]}$$

where
G is the GDP
r_f is the **risk-free rate**
p_n is the **nuclear risk premium**
enables the estimation of the **nuclear risk** in Ukraine.

The End

Pricing Government of India War Bonds

Soumadeep Ghosh

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Abstract

In this paper, I describe how to price Government of India War Bonds. The paper ends with "The End"

Introduction

There exist exactly three (3) Government of India War Bonds with face values of INR 100, 1000 and 10000, each paying two coupons. The Government of India War Bond with face value of INR 100 pays two coupons of INR 25 and INR 25. The Government of India War Bond with face value of INR 1000 pays two coupons of INR 229 and INR 249. The Government of India War Bond with face value of INR 10000 pays two coupons of INR 2229 and INR 2449. In this paper, I describe how to price Government of India War Bonds.

Pricing Government of India War Bonds

First, we price each Government of India War Bond with the **Discounted Cash-flow Method**

$$P_1 = 25 + \frac{25}{1+r} + \frac{100}{(1+r)^2}$$

$$P_2 = 229 + \frac{249}{1+r} + \frac{1000}{(1+r)^2}$$

$$P_3 = 2229 + \frac{2449}{1+r} + \frac{10000}{(1+r)^2}$$

We solve the equation

$$m(P_1 + P_2 + P_3) = 1$$

for the **Stochastic Discount Factor** m
whence

$$m = \frac{(r+1)^2}{4483r^2 + 13889r + 29506}$$

We solve the equation

$$m = r$$

for the real solution

$$m = r = 0.000033893169$$

to 8 significant figures

The End

The general solution to the cubic equation

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the general solution to the cubic equation. The paper ends with "The End"

Introduction

In this paper, I describe the general solution to the cubic equation.

The general solution to the cubic equation

The general cubic equation is

$$ax^3 + bx^2 + cx + d = 0$$

The general solution to the general cubic equation is

$$x_1 = \frac{\sqrt[3]{\sqrt{(-27a^2d + 9abc - 2b^3)^2 + 4(3ac - b^2)^3} - 27a^2d + 9abc - 2b^3}}{3\sqrt[3]{2}a} - \frac{\sqrt[3]{2}(3ac - b^2)}{3a\sqrt[3]{\sqrt{(-27a^2d + 9abc - 2b^3)^2 + 4(3ac - b^2)^3} - 27a^2d + 9abc - 2b^3}} - \frac{b}{3a}$$

$$x_2 = -\frac{(1 - i\sqrt{3})\sqrt[3]{\sqrt{(-27a^2d + 9abc - 2b^3)^2 + 4(3ac - b^2)^3} - 27a^2d + 9abc - 2b^3}}{6\sqrt[3]{2}a} + \frac{(1 + i\sqrt{3})(3ac - b^2)}{3\ 2^{2/3}a\sqrt[3]{\sqrt{(-27a^2d + 9abc - 2b^3)^2 + 4(3ac - b^2)^3} - 27a^2d + 9abc - 2b^3}} - \frac{b}{3a}$$

$$x_3 = -\frac{(1 + i\sqrt{3})\sqrt[3]{\sqrt{(-27a^2d + 9abc - 2b^3)^2 + 4(3ac - b^2)^3} - 27a^2d + 9abc - 2b^3}}{6\sqrt[3]{2}a} + \frac{(1 - i\sqrt{3})(3ac - b^2)}{3\ 2^{2/3}a\sqrt[3]{\sqrt{(-27a^2d + 9abc - 2b^3)^2 + 4(3ac - b^2)^3} - 27a^2d + 9abc - 2b^3}} - \frac{b}{3a}$$

where

$$i^2 + 1 = 0$$

The End

One of the roots of the quartic equation

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe one of roots of the quartic equation. The paper ends with "The End"

Introduction

In a previous paper, I've described the general solution to the cubic equation. The general solution to the quartic equation is known but is too large and complicated for practical use. Solving the quartic equation is easier done by dividing the quartic equation by one of the roots to obtain a cubic equation and using the general solution to the cubic equation to find the remaining roots. In this paper, I describe one of roots of the quartic equation.

One of the roots of the quartic equation

The general quartic equation is

$$ax^4 + bx^3 + cx^2 + dx + e = 0$$

One of the roots of the quartic equation is

$$x_1 = -\frac{b}{4a} - \frac{1}{2}\sqrt{\left(\frac{b^2}{4a^2} - \frac{2c}{3a} + \frac{2^{1/3}\left(c^2 - 3bd + 12ae\right)}{3a\left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace + \sqrt{-4\left(c^2 - 3bd + 12ae\right)^3 + \left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace\right)^2}\right)^{1/3}} + \frac{\left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace + \sqrt{-4\left(c^2 - 3bd + 12ae\right)^3 + \left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace\right)^2}\right)^{1/3}}{3 \times 2^{1/3} a}\right) - \frac{1}{2}\sqrt{\left(\frac{b^2}{2a^2} - \frac{4c}{3a} - \frac{2^{1/3}\left(c^2 - 3bd + 12ae\right)}{3a\left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace + \sqrt{-4\left(c^2 - 3bd + 12ae\right)^3 + \left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace\right)^2}\right)^{1/3}} - \frac{\left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace + \sqrt{-4\left(c^2 - 3bd + 12ae\right)^3 + \left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace\right)^2}\right)^{1/3}}{3 \times 2^{1/3} a} - \frac{-\frac{b^3}{a^3} + \frac{4bc}{a^2} - \frac{8d}{a}}{4\sqrt{\frac{b^2}{4a^2} - \frac{2c}{3a} + \frac{2^{1/3}\left(c^2 - 3bd + 12ae\right)}{3a\left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace + \sqrt{-4\left(c^2 - 3bd + 12ae\right)^3 + \left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace\right)^2}\right)^{1/3}} + \frac{\left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace + \sqrt{-4\left(c^2 - 3bd + 12ae\right)^3 + \left(2c^3 - 9bcd + 27ad^2 + 27b^2e - 72ace\right)^2}\right)^{1/3}}{3 \times 2^{1/3} a}}}\right)$$

The End

My curse on Krishna

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe my curse on Krishna.

My curse on Krishna

As a devotee of Krishna, I'm pained to describe that Krishna is no longer able to protect his devotees - both in Kolkata, India and out of Kolkata, India.
More specifically, the son of Arjun, called Abhimanyu, was killed in the battle field at Kurukshetra in spite of being a devotee of Krishna.
Therefore, I place a curse on Krishna that he shall never again be worshiped anywhere in the universe.

The End

1 statistical solution to population

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe 1 statistical solution to population. The paper ends with "The End"

Introduction

Contrary to popular belief, 1 statistical solution to population exists. In this paper, I describe 1 statistical solution to population.

1 statistical solution to population

$$p_1 = 1, p_2 = 1, p_3 = 1, p_4 = 1, p_5 = 1, p_6 = 1, p_7 = 1,$$

$$p_8 = 1, p_9 = 1, p_{10} = 1, p_{11} = 1, p_{12} = 1, p_{13} = 1, p_{14} = 1,$$

$$\mu = 1, \sigma = 0$$

The End

Major commodities traded in the world

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe major commodities traded in the world. The paper ends with "The End"

Introduction

A good is said to be **fungible** when the market treats instances of the good as equivalent with no regard to who produced them. A **commodity** is an economic good that has full or substantial fungibility. As of this writing, there are many commodities traded in the world. In this paper, I describe the major commodities traded in the world.

Major commodities traded in the world

Energy commodities

1. Coal
2. Crude oil
3. Heating oil
4. Gasoline
5. Natural gas
6. Ethanol
7. Naptha
8. Propane
9. Uranium

Agricultural commodities

1. Butter
2. Canola
3. Cheese
4. Cocoa
5. Coffee
6. Corn
7. Cotton
8. Lumber
9. Milk
10. Oat
11. Orange juice
12. Palm oil
13. Potatoes
14. Rapeseed oil
15. Rice
16. Rubber
17. Soyabean
18. Sugar
19. Sunflower oil
20. Tea
21. Wheat
22. Wool

Livestock commodities

1. Beef
2. Eggs
3. Cattle feed
4. Lean hog
5. Live cattle
6. Poultry
7. Salmon

Metals and related commodities

1. Gold
2. Silver
3. Copper
4. Iron ore
5. Steel
6. Lithium
7. Platinum
8. Titanium

Industrial commodities

1. Aluminium
2. Bitumen
3. Cobalt
4. Ammonium phosphate
5. Gallium
6. Germanium
7. Indium
8. Lead
9. Magnesium

10. Manganese
11. Molybdenum
12. Neodymium
13. Nickel
14. Palladium
15. Polyethylene
16. Polypropylene
17. Polyvinyl
18. Rhodium
19. Soda Ash
20. Tellurium
21. Tin
22. Urea
23. Zinc

The End

Major industries found in most nations

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe major industries found in most nations.
The paper ends with "The End"

Introduction

As of this writing, most nations in the world have gone through **industrialization** that has increased production of products in the world and have increased both income and quality of life of most individuals in the world. As a result of industrialization, major industries are now found in most nations. In this paper, I describe major industries found in most nations.

Major industries found in most nations

1. **Industries based on production of commodities**

   The most common example found around the world are the coal and steel industries in a nation but also include industries based on agriculture and food.

2. **Industries based on finance and banking**

   The most common example found around the world are the central banks and investment banks but also include networks of co-operative banks and savings banks.

3. **Industries based on land and real estate**

   The most common example found around the world is the prime real-estate industry found in the capital of any nation but also include prime real-estate in major metropolitan cities around the world.

4. **Industries based on artistry and entertainment**

   The most common example found around the world are the film industry in any nation but also include associations of artists around the world to produce high-value objects of art.

5. **Industries based on hospitality and travel**

   The most common example found around the world are the hotel industry in any nation but also include international networks of airlines, sea-lines and ports around the world.

6. **Industries based on charities and non-governmental entities**

   The most common example found around the world are networks of charitable institutions in any nation but also include non-governmental entities like NGOs involved in charitable work.

The End

Achieving immortality

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe how to achieve immortality. The paper ends with "The End"

Introduction

Individuals have been searching for immortality since millennia. But we now know the practical means of achieving immortality. In this paper, I describe how to achieve immortality.

The main impediment to longer lifespan in humans

With the exceptions of major wars and natural disasters, the main impediment to longer lifespan in humans is essentially slow poisoning of the human body, whether through pollution or accumulation of toxins in the body through the food cycle.

What keeps humans alive

What keeps humans alive is the regeneration of the cells in the body through the natural process of cell division and cell repair.

How to achieve immortality

Therefore, we now have insights from biology that tell us precisely how we can achieve immortality: **keep the cell division and cell repair process from faltering.**

What does this mean practically?

With the availability of gene-editing technologies today, it is theoretically possible to keep the cell division and cell repair process from faltering by replacing worn out genes with fresh copies of those genes. This means that we already have the means to longer lifespans and at least know what we need to do to achieve immortality.

The End

The secret of feminism

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the secret of feminism. The paper ends with "The End"

Introduction

All women (and indeed females irrespective of their nation of origin and across species) know the secret of feminism. In this paper, I describe the secret of feminism.

The secret of feminism

Hard times lead to strong men.
Strong men lead to good times.
Good times lead to soft men.
Soft men lead back to hard times.

How females break the cycle

Females innately know how to break the cycle and females in all societies break the cycle whenever they choose to be in good times with strong men.

The End

A model of the price of gold

Soumadeep Ghosh

Kolkata, india

Abstract

In this paper, I describe a model of the price of gold. The paper ends with "The End"

Introduction

Pricing gold (and similar precious metals) is fundamentally different from pricing other assets because of the following reasons:

1. Gold is an international asset that allows the owner to earn **seigniorage**.
2. Thus, the production of gold encounters the problem of **pilferage**.
3. Thus, the produced gold is **guarded**.
4. Thus, volatility in the price of gold is **undesired**.

Ghosh's model of the price of gold

My model of the price of gold captures the facts mentioned above to reach a holistic price of gold using two equations:

$$p_G(t) = \frac{P(t)(1 - f(t) - g(t))}{1 + r_f(t) + p_{r,G}(t)}$$

$$|\frac{p_G(t)}{max(p_G(t))} \frac{p_{r,G}(t)}{max(p_{r,G}(t))}| < \kappa$$

where
$p_G(t)$ is the price of gold a function of time
$P(t)$ is the production of gold as a function of time
$f(t)$ is the fraction of production of gold pilfered as a function of time
$g(t)$ is the fraction of production of gold spent on guarding as a function of time
$r_f(t)$ is the risk-free rate as a function of time
$p_{r,G}(t)$ is the **gold risk-premium** as a function of time
κ is the **gold volatility control constant**

The End