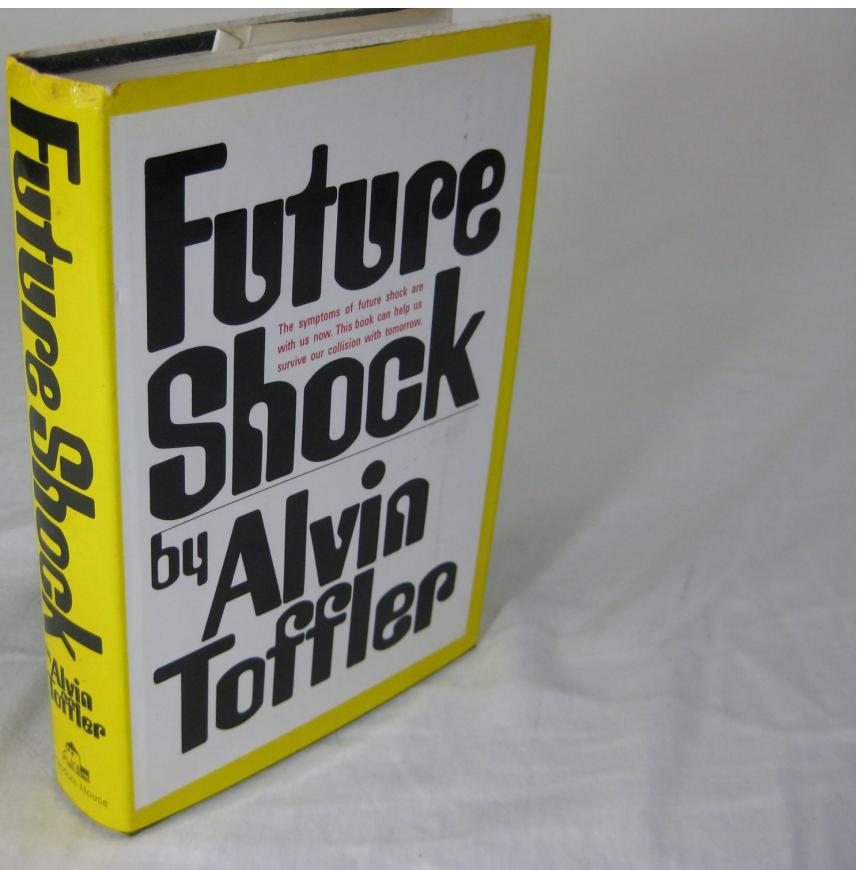


ChatGPT- Opportunity and Challenge for teaching

1. Future Shock

Marc Alier - <https://wasabi.essi.upc.edu/ludo>

English version - August 2023





Briefly explain the concept of future shock and its origin



"Future shock" is a term coined by futurist Alvin Toffler in his 1970 book of the same name. It refers to the psychological distress and disorientation experienced by individuals or societies when they are confronted with rapid and overwhelming technological, social, or cultural change. The concept is based on the premise that the pace of change in modern society is accelerating at an unprecedented rate, and that this rapid change can be difficult for people to cope with, leading to feelings of confusion, anxiety, and even alienation.

Toffler argued that future shock is a natural consequence of the accelerating rate of change in the modern world, and that it can manifest in various ways, including stress, disorientation, and a sense of being overwhelmed. He also suggested that future shock could have serious social and political implications, as individuals and societies struggle to adapt to the rapid pace of change.

The concept of future shock has been widely discussed and debated since Toffler introduced it, and it has been used to explain a wide range of phenomena, from the rise of populist movements to the challenges of adapting to new technologies. While some critics have argued that the concept is overly simplistic or that it exaggerates the negative effects of change, it has nonetheless become an influential idea in discussions about the impact of technological and social change on individuals and societies.

<https://chat.openai.com/share/541bf12e-a185-4686-aeb2-e307c430c48c>

A screenshot of a web browser window showing the OpenAI Chat interface at chat.openai.com. The user has asked, "Briefly explain the concept of future shock and its origin". The AI response is as follows:

"Future shock" is a term coined by futurist Alvin Toffler in his 1970 book of the same name. It refers to the psychological distress and disorientation experienced by individuals or societies when they are confronted with rapid and overwhelming technological, social, or cultural change. The concept is based on the premise that the pace of change in modern society is accelerating at an unprecedented rate, and that this rapid change can be difficult for people to cope with, leading to feelings of confusion, anxiety, and even alienation.

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Example of future shock

⚡ GPT-3.5

🧩 GPT-4 ▾

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🧩 Plugins Beta



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EXTENDED KEYBOARD

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RANDOM

Compute expert-level answers using Wolfram's breakthrough
algorithms, knowledgebase and AI technology

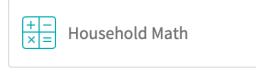
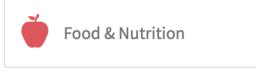
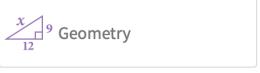
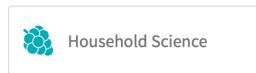
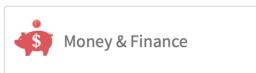
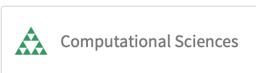
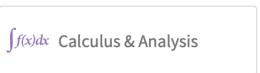
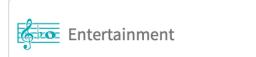
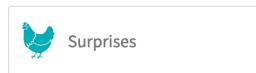
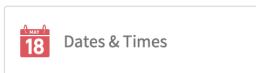
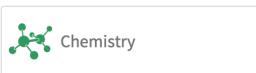
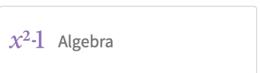
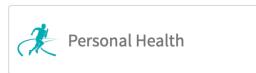
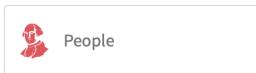
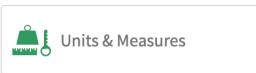
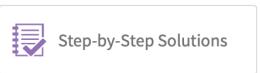
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Mathematics

Science & Technology

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Everyday Life





propose a prop which describes an engineering problem that can be solved by wolfram alpha and that the solution includes the representation of a graph



Problem Statement: "Determine the optimal angle of launch for a projectile to achieve maximum range on a flat surface, assuming no air resistance. Plot the range of the projectile as a function of the launch angle."



Description: In this engineering problem, we are interested in finding the optimal angle at which to launch a projectile in order to achieve the maximum horizontal distance (range) on a flat surface. We will assume that there is no air resistance acting on the projectile. The problem can be solved by analyzing the kinematics of projectile motion and finding the angle that maximizes the range. We will use Wolfram Alpha to perform the calculations and plot the range of the projectile as a function of the launch angle.

Solution Steps:

1. Use the kinematic equations for projectile motion to derive an expression for the range of the projectile as a function of the launch angle and initial velocity.
2. Use calculus to find the angle that maximizes the range.
3. Plot the range of the projectile as a function of the launch angle, highlighting the optimal angle.

We will use Wolfram Alpha to perform the calculations and generate the plot.

Regenerate



Let's start by deriving the expression for the range of the projectile as a function of the launch angle and initial velocity.



The horizontal and vertical components of the initial velocity are given by:

$$v_x = v_0 \cos(\theta)$$

$$v_y = v_0 \sin(\theta)$$

where v_0 is the initial velocity and θ is the launch angle.

The time of flight of the projectile is given by:

$$t = \frac{2v_y}{g} = \frac{2v_0 \sin(\theta)}{g}$$

where g is the acceleration due to gravity.

The range of the projectile is given by:

$$R = v_x t = v_0 \cos(\theta) \frac{2v_0 \sin(\theta)}{g} = \frac{v_0^2 \sin(2\theta)}{g}$$

We can use calculus to find the angle that maximizes the range. Let's differentiate the range with respect to the launch angle and set it equal to zero to find the optimal angle. We will use Wolfram Alpha to perform the calculations.

Used Wolfram



The derivative of the range with respect to the launch angle θ is given by:

Regenerate

2 (0)

<https://chat.openai.com/share/9023bb4b-0bd8-4c73-8fec-08f687a85899>



Let's start by calculating the range of a projectile launched at an angle θ from a height h with initial velocity v_0 .

$$\frac{dR}{d\theta} = \frac{2v_0^2 \cos(2\theta)}{g}$$

The horizontal component of the velocity is:

$$v_x = v_0 \cos(\theta)$$

$$v_y = v_0 \sin(\theta)$$

Setting this equal to zero and solving for θ , we find the optimal angle:

$$\theta = \frac{\pi}{4}$$

where v_0 is the initial velocity and g is the acceleration due to gravity.

The time of flight is:

$$t = \frac{2v_y}{g}$$

where $g = 9.8 \text{ m/s}^2$.

This corresponds to an angle of 45° . This is the angle that maximizes the range of the projectile.

Now, let's plot the range of the projectile as a function of the launch angle, highlighting the optimal angle. We will use Wolfram Alpha to generate the plot.

Used Wolfram

The range of the projectile is given by:

$$R = v_x t = v_0 \cos(\theta) \cdot \frac{2v_0 \sin(\theta)}{g} = \frac{v_0^2 \sin(2\theta)}{g}$$

Here is the plot of the range of the projectile as a function of the launch angle θ , with $v_0 = 1$ and $g = 9.8 \text{ m/s}^2$:

We can use Wolfram Alpha to perform the calculations.

with respect to the launch angle θ .

Wolfram Alpha to perform the calculations.

Used Wolfram

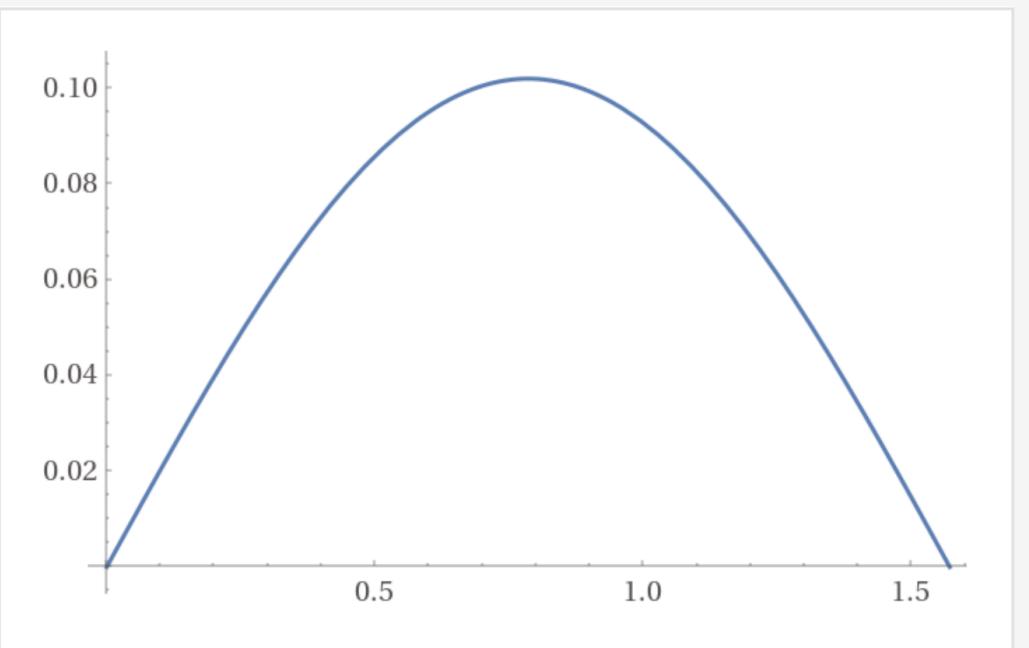
The derivative of the range with respect to the launch angle θ is given by:

Regenerate

2023-08-08 10:00

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The derivative of the range with respect to the launch angle θ is given by:



the range of the

angle, highlighting the

angle θ , with $v_0 = 1$

As we can see from the plot, the range of the projectile is maximized when the launch angle θ is $\frac{\pi}{4}$ or 45° . This is consistent with our earlier calculation.

The arc length of the polar curve is approximately 0.247154.

This concludes the solution to the problem.

2 / 20

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We can use calculus to find the angle that maximizes the range. Let's differentiate the range with respect to the launch angle and set it equal to zero to find the optimal angle. We will use Wolfram Alpha to perform the calculations.

Used **Wolfram**



REQUEST TO WOLFRAM



```
{  
  "input": "derivative of (v0^2 * sin(2*theta) / g) with respect to theta"  
}
```

RESPONSE FROM WOLFRAM



Query:
"derivative of (v0^2 * sin(2*theta) / g) with respect to theta"

Derivative:
 $d/d\theta((v0^2 \sin(2 \theta))/g) = (2 v0^2 \cos(2 \theta))/g$

Expanded trigonometric form:
 $(2 v0^2 \cos^2(\theta))/g + (2 v0^2 (-1) \sin^2(\theta))/g$

Alternate forms:
 $(4 v0^2 \sin(\pi/4 - \theta) \sin(\theta + \pi/4))/g$
 $(e^{(-2 i \theta)} v0^2)/g + (e^{(2 i \theta)} v0^2)/g$

Expanded cosine form:
 $-(2 v0^2)/g + (4 v0^2 \cos^2(\theta))/g$

We can use calculus to find the angle that maximizes the range. Let's differentiate the range.

with respect to the la

Wolfram Alpha to pe

Used Wolfram

```
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REQUEST TO WOLFRAM

RESPONSE FROM WOLFRAM

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"derivative of (v0^2 * sin(2*theta) / g) with respect to theta"

Derivative:
 $\frac{d}{d\theta} \left(\frac{v_0^2 \sin(2\theta)}{g} \right) = \frac{2 v_0^2 \cos(2\theta)}{g}$

Expanded trigonometric form
 $\frac{2 v_0^2 \cos^2(\theta)}{g} + \frac{2 v_0^2 (-1) \sin^2(\theta)}{g}$

Alternate forms
 $\frac{4 v_0^2 \sin\left(\frac{\pi}{4} - \theta\right) \sin\left(\theta + \frac{\pi}{4}\right)}{g}$
 $\frac{e^{-2i\theta} v_0^2}{g} + \frac{e^{2i\theta} v_0^2}{g}$

Expanded cosine form
 $-\frac{2 v_0^2}{g} + \frac{4 v_0^2 \cos^2(\theta)}{g}$

Expanded sine form
 $\frac{2 v_0^2}{g} - \frac{4 v_0^2 \sin^2(\theta)}{g}$

WolframAlpha computational intelligence™

derivative of $(v0^2 * \sin(2*\theta) / g)$ with respect to theta

NATURAL LANGUAGE MATH INPUT EXTENDED KEYBOARD EXAMPLES UPLOAD RANDOM

Derivative Step-by-step solution

$$\frac{\partial}{\partial\theta} \left(\frac{v_0^2 \sin(2\theta)}{g} \right) = \frac{2 v_0^2 \cos(2\theta)}{g}$$

Expanded trigonometric form Step-by-step solution

$$\frac{2 v_0^2 \cos^2(\theta)}{g} + \frac{2 v_0^2 (-1) \sin^2(\theta)}{g}$$

Alternate forms

$$\frac{4 v_0^2 \sin\left(\frac{\pi}{4} - \theta\right) \sin\left(\theta + \frac{\pi}{4}\right)}{g}$$
$$\frac{e^{-2i\theta} v_0^2}{g} + \frac{e^{2i\theta} v_0^2}{g}$$

Expanded cosine form Step-by-step solution

$$-\frac{2 v_0^2}{g} + \frac{4 v_0^2 \cos^2(\theta)}{g}$$

Expanded sine form Step-by-step solution

$$\frac{2 v_0^2}{g} - \frac{4 v_0^2 \sin^2(\theta)}{g}$$



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Challenges and Opportunities

Challenges and opportunities as teachers

- To what extend these new tools are capable and accurate (In general and in our knowledge domain) ?
- How do we take the maximum advantage of them to improve the quality of our work (and our productivity) ?
- How does it affect to our teaching process ?
- How does it affect the learning process ?
- How does it affect the assessment process ?

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English version - August 2023