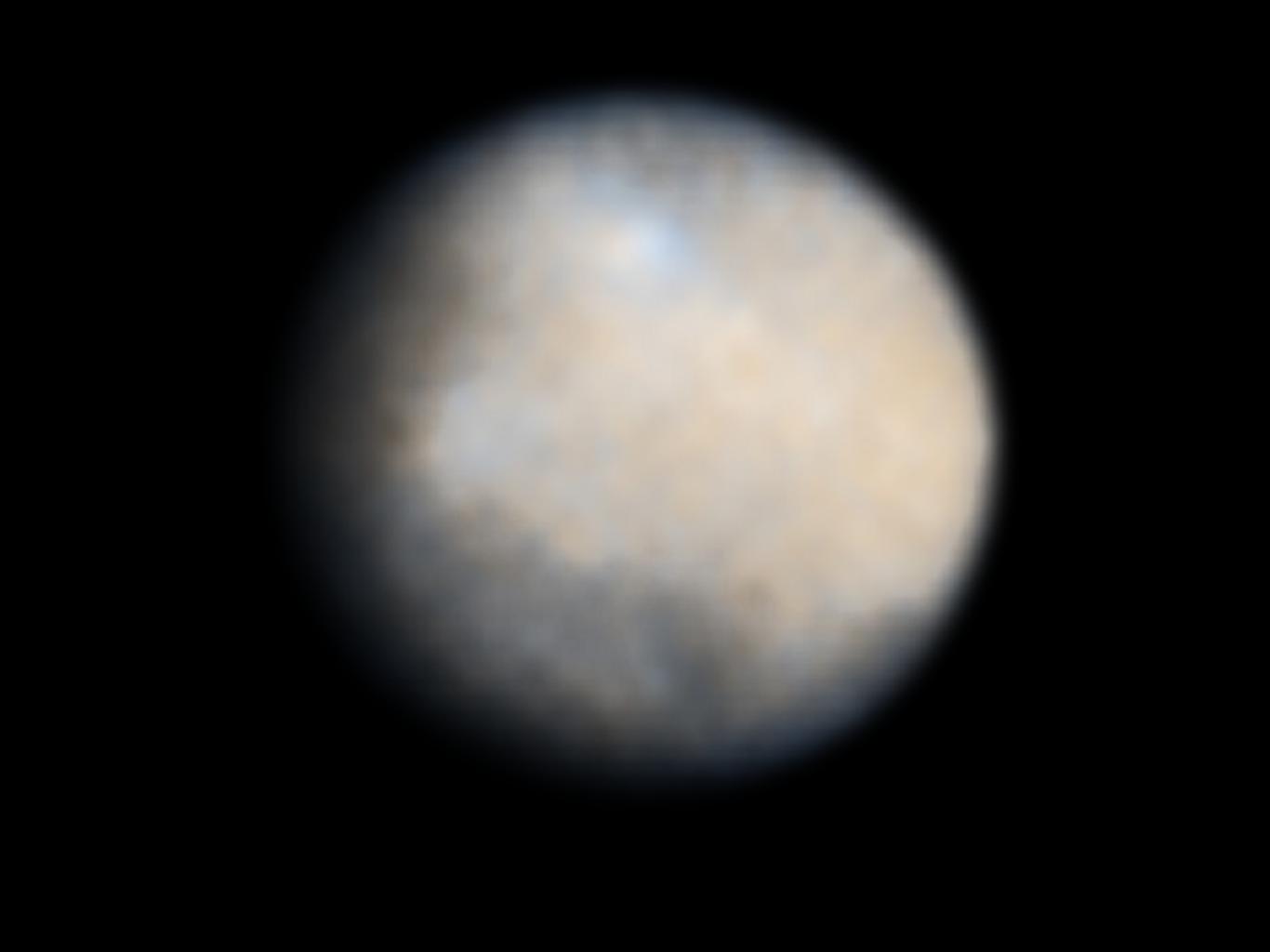
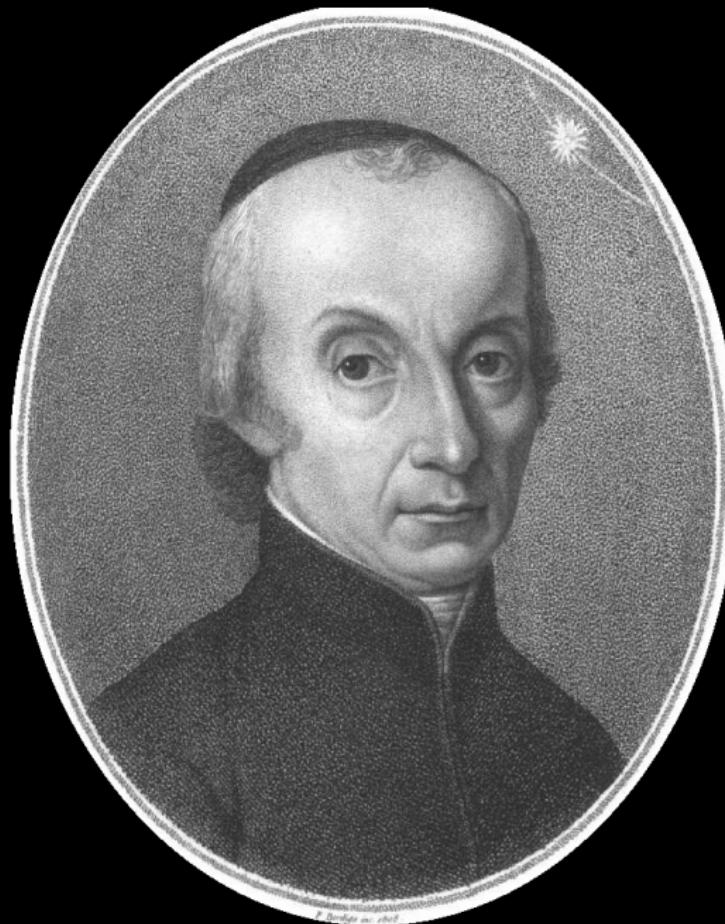


How the Planets Affect Our Daily Lives ...

... A Brief History of Uncertainty



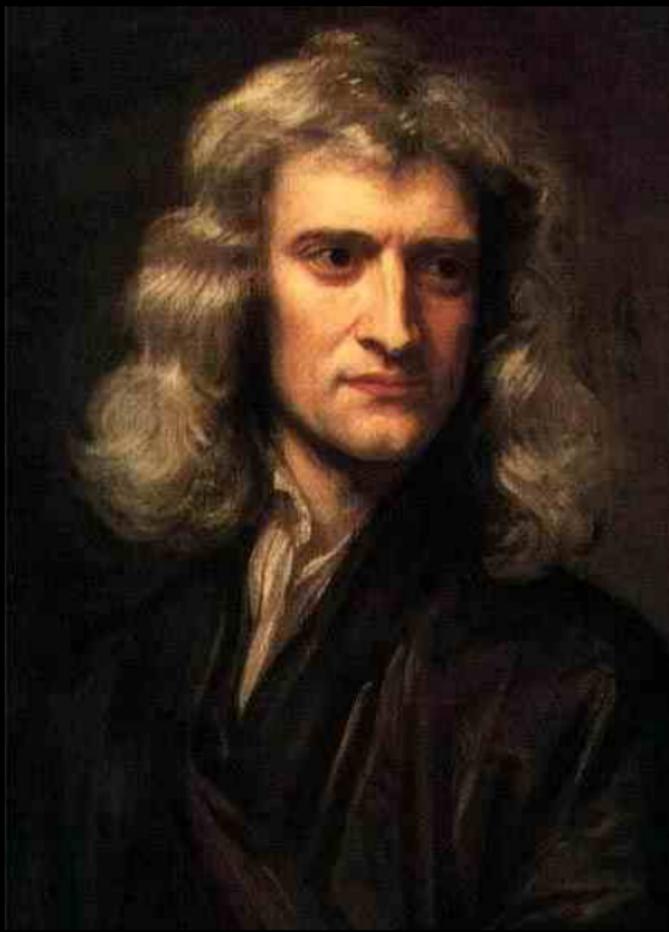


P. Burdett sculpsit 1782

Beobachtungen des zu Palermo am 1. Jan. 1801 von Prof. Piazzi neu entdeckten Gestirns.

1801	Mittlere sonnen- Zeit	Gerade Aufstieg in Zeit	Gerade Auf- steigung in Graden.	Nördl. Abweich.	Geocentr.che Länge	Geocentr. Breite	Ort der Sonne + 20° Aberration	Logar. d. Distanz ⊕ 3
	St	St	St	St	Z	Z	Z	Z
Jan.	1 8 43 37.8	3 27 11.25	51 47 48.8	15 37 43.5	1 23 22 58.3	3 6 42.1	9 11 1 30.9	9.9926156
	2 8 39 24.6	3 26 53.85	51 43 27.8	15 41 5.5	1 23 19 44.3	3 2 24.9	9 12 2 28.6	9.9926317
	3 8 34 53.3	3 26 38.4	51 39 36.0	15 44 31.6	1 23 16 58.6	2 53 9.9	9 13 3 26.6	9.9926324
	4 8 30 42.1	3 26 23 15	51 35 47.3	15 47 57.6	1 23 14 75.5	2 53 55.6	9 14 4 24.9	9.9926418
	10 8 6 15.8	3 25 32.1	51 28 1.5	16 10 52.0	1 23 7 59.1	2 29 0.6	9 20 10 17.5	9.9927641
	11 8 2 17.5	3 25 29.7	51 23 26.6
	13 7 54 26.2	3 25 30.30	51 22 34.5	16 22 49.5	1 23 10 27.6	2 16 59.7	9 23 12 13.8	9.9928490
	14 7 50 34.7	3 25 31.72	51 22 55.8	16 27 5.7	1 23 12 1.2	2 12 56.7	9 24 14 13.5	9.9928809
	17 7 35 11.3	3 25 55.44	51 28 45.0	16 40 13.0
	18 7 31 28.5	3 26 8.15	51 32 27.3	16 49 16.1	1 23 25 59.2	1 53 38.2	9 29 19 53.6	9.9930607
	21 7 24.27	3 26 34.27	51 38 34.1	16 58 33.9	1 23 34 21.3	1 45 6.0	10 1 20 40.3	9.9931434
	22 7 20 21.7	3 26 49.42	51 41 21.3	17 3 18.5	1 23 39 1.8	1 42 28.1	10 2 21 52.0	9.9931886
	23 7 16 45.5	3 27 6.90	51 46 43.5	17 8 5.5	1 23 44 15.7	1 38 52.1	10 3 22 22.7	9.9932348
	28 6 58 51.3	3 28 54.55	52 13 38.3	17 32 54.1	1 24 15 15.7	1 21 6.9	10 8 26 20.1	9.9935062
	30 6 51 52.9	3 29 48.14	52 27 2.1	17 43 11.0	1 24 30 9.0	1 14 16.0	10 10 27 46.2	9.9936332
	31 6 48 26.4	3 30 17.25	52 34 18.8	17 48 21.5	1 24 38 7.3	1 10 54.6	10 11 28 28.5	9.9937007
Febr.	1 6 44 59.9	3 30 47.22	52 41 48.0	17 53 36.3	1 24 46 19.3	1 7 30.9	10 12 29 9.6	9.9937703
	2 6 41 35.8	3 31 19.06	52 49 45.9	17 58 57.5	1 24 54 57.9	1 4 19.5	10 13 29 49.9	9.9938423
	5 6 31 31.5	3 33 2.70	53 15 40.5	18 15 1.0	1 25 22 43.4	0 54 23.9	10 16 31 45.5	9.9940751
	8 6 21 39.2	3 34 58.50	53 44 37.5	18 31 23.2	1 25 53 29.5	0 45 5.0	10 19 33 33.3	9.9943276
	11 6 11 58.2	3 37 6.54	54 16 38.1	18 47 58.8	1 26 26 40.0	0 36 2.9	10 22 35 13.4	9.9945823





hier in der Nähe der Quadratur der Einfluss der Sonnen-Länge geringer ist, als in andern Lage. Dr. Gauß glaubt daher, dass es nicht undenlich wäre, wenn man die Fehler der Sonnentafeln aus sehr genauen Beobachtungen für diese Zeiten bestimme, und die Örter der Sonne hierauf verbessere. Diese vierzen Elemente sind nun folgende:

Sonneulare	326° 27' 38"	Hieraus:
Ω	0° 44'	größte Mittelp. Glef.
Neigung	10° 36' 57"	ebung 9° 27' 41"
Log. halb. gr. Axe	0.4420527	tägl. mittlere helioc.
Exzentrizität	0.0825017	tropische Beweg. 770° 914'
Epocha	1800 31 Dec. 77° 36' 34"	

Aus diesen Elementen hat Dr. Gauß folgende Örter der *Ceres Ferdinandea* im voraus berechnet. Die Zeit ist mittlere für Mitternacht in Palermo.

1801	Geocentrische Länge	Geocentrische Länge der Breite von der S	Logarith. der Ab- standes von der S	Logarith. des Ab- standes von der S	Verhältnis der befeh- lernen Heilige
Z					
Nov. 25	5 20 16	9 25 0	0.42181	0.40468	0.6102
Dec.	15 22 15	9 48 0	0.40940	0.40472	0.6159
7	24 7 10 12	10 39 43	0.4047916	0.4047916	0.6555
13	25 51 37	10 38 96	0.4048816	0.4048816	7290
19	27 27 11	10 36 02	0.4049976	0.4049976	7770
25	28 53 11	10 34 68	0.4051206	0.4051206	8295
31	6 10 12	10 34 000	0.4052806	0.4052806	8869

Sollte man den Ort des Planeten nach diesen Elementen genauer, oder auf eine längere Zeit berechnen wollen: so setzen wir zu diesem Behufe noch folgende Formeln hierher:

1) Zur

Epoche 1800 31 Dec. 77° 36' 34"

Aus diesen Elementen hat Dr. Gauß folgende
Orter der *Ceres Ferdinandea* im voraus berechnet.
Die Zeit ist mittlere für Mitternacht in Palermo.

1801.	Geocentrische Länge	Geocentrische Breite nördl.	Logarith. des Abstandes von der ☽	Logarith. des Abstandes von der ☽	Verhältnis der gefundenen Helligk.
Nov. 25	5 20 16	9 25	0, 42181	0, 40468	0, 6102
Dec. 1	5 22 15	9 48	0, 40940	0, 40472	0, 6459
	7 5 24 7	10 12	0, 39643	0, 40479	0, 6855
	13 5 25 51	10 37	0, 38296	0, 40488	0, 7290
	19 5 27 27	11 4	0, 36902	0, 40499	0, 7770
	25 5 28 53	11 32	0, 35468	0, 40512	0, 8295
31	6 0 10 12	1	0, 34000	0, 40528	0, 8869

Sollte man den Ort des Planeten nach diesen Elementen genauer, oder auf eine längere Zeit berechnen wollen: so setzen wir zu diesem Behufe noch folgende Formeln hierher:



DELLA SCOPERTA
DEL NUOVO PIANETA
CERERE FERDINANDEA

OTTAVO TRA I PRIMI DELL' NOSTRO SISTEMA

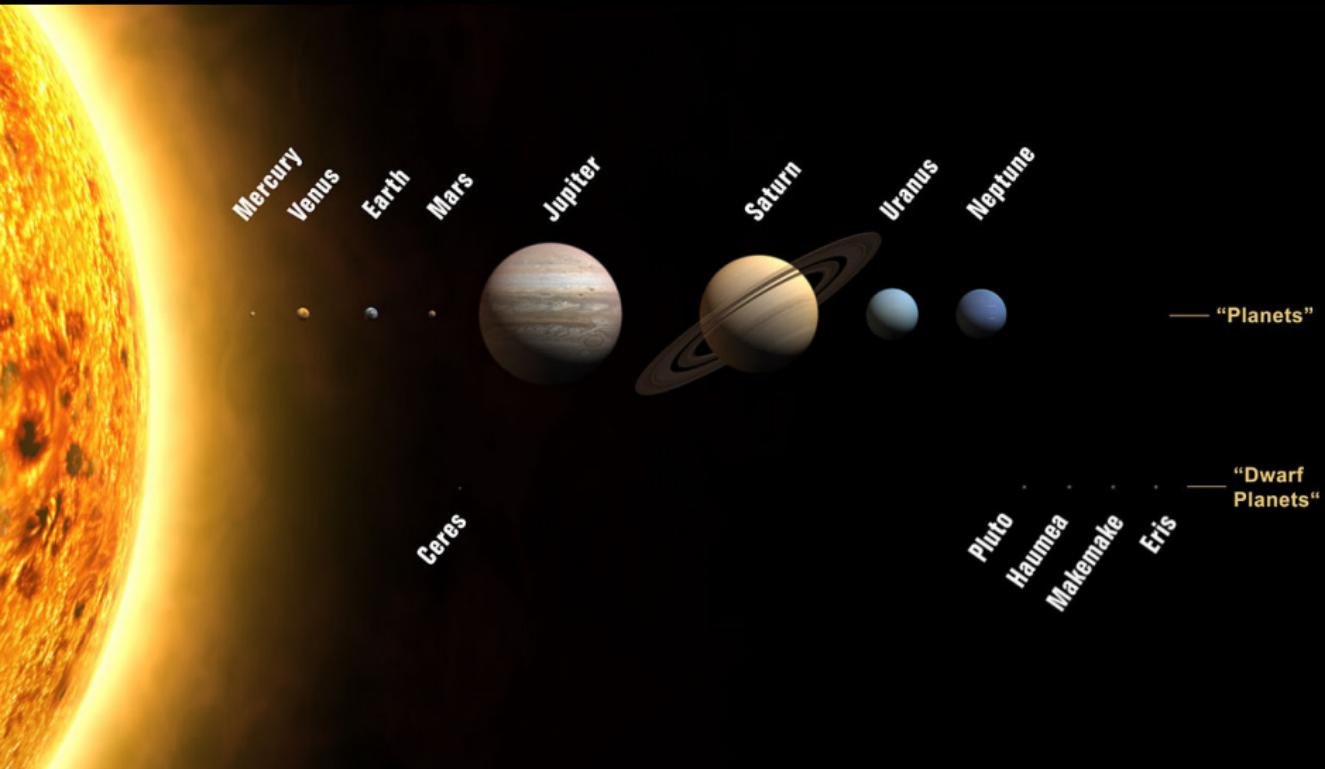
SOLARE.



PALERMO
1803

NELLA STAMPERIA REALE.







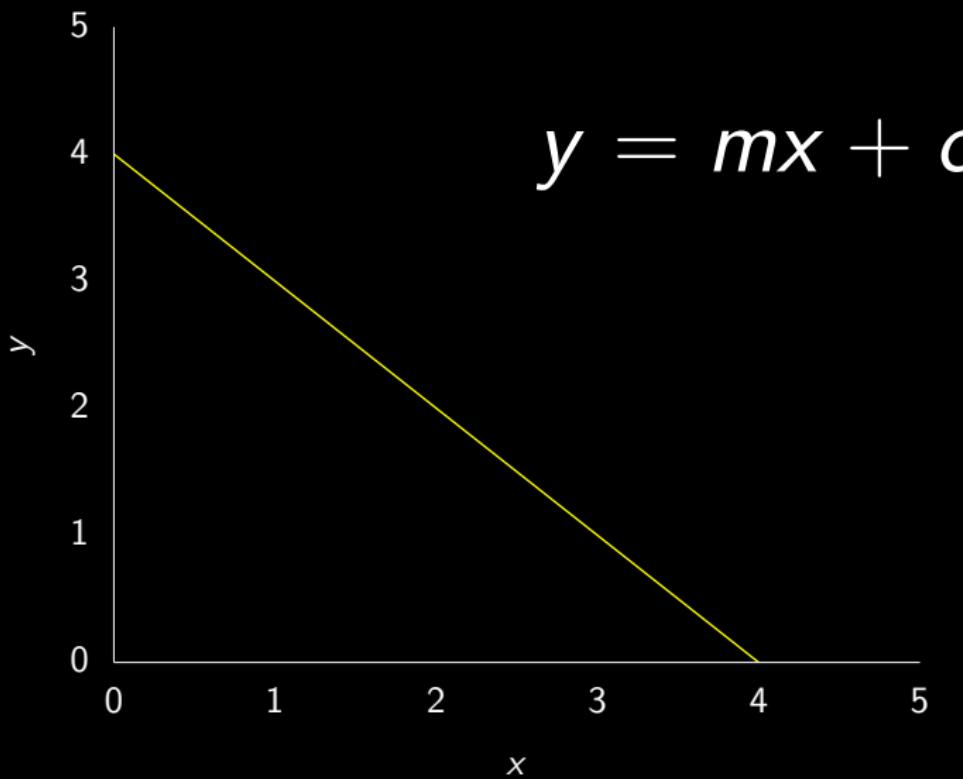
TONY RYAN

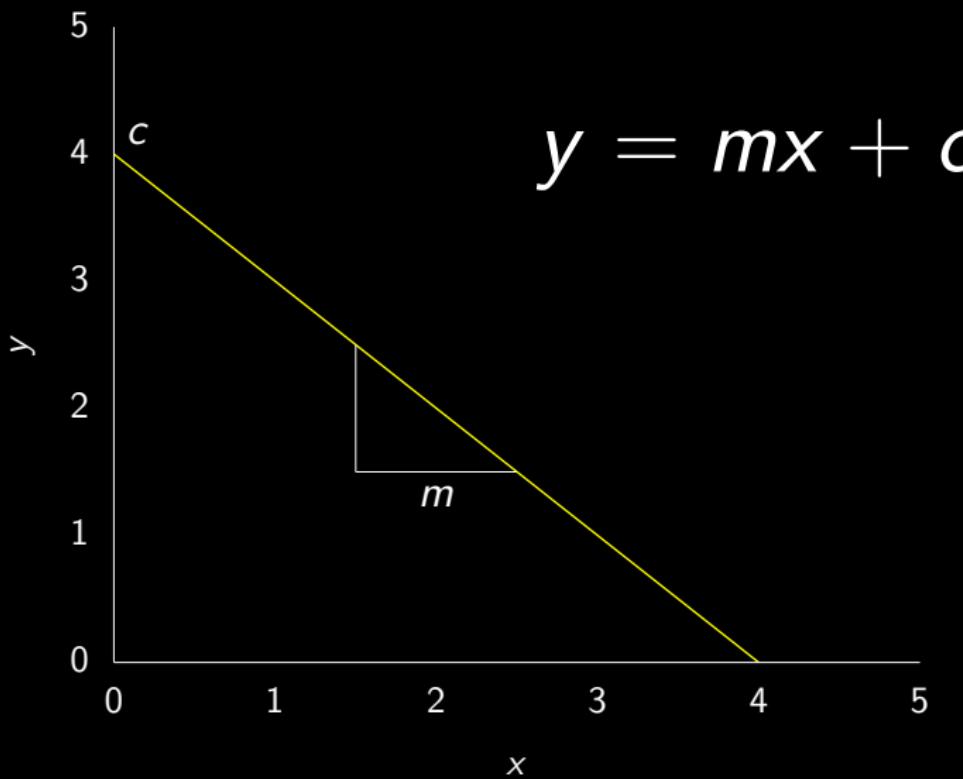
Ways to Win
Sheffield Festival of
Science & Engineering
and Art

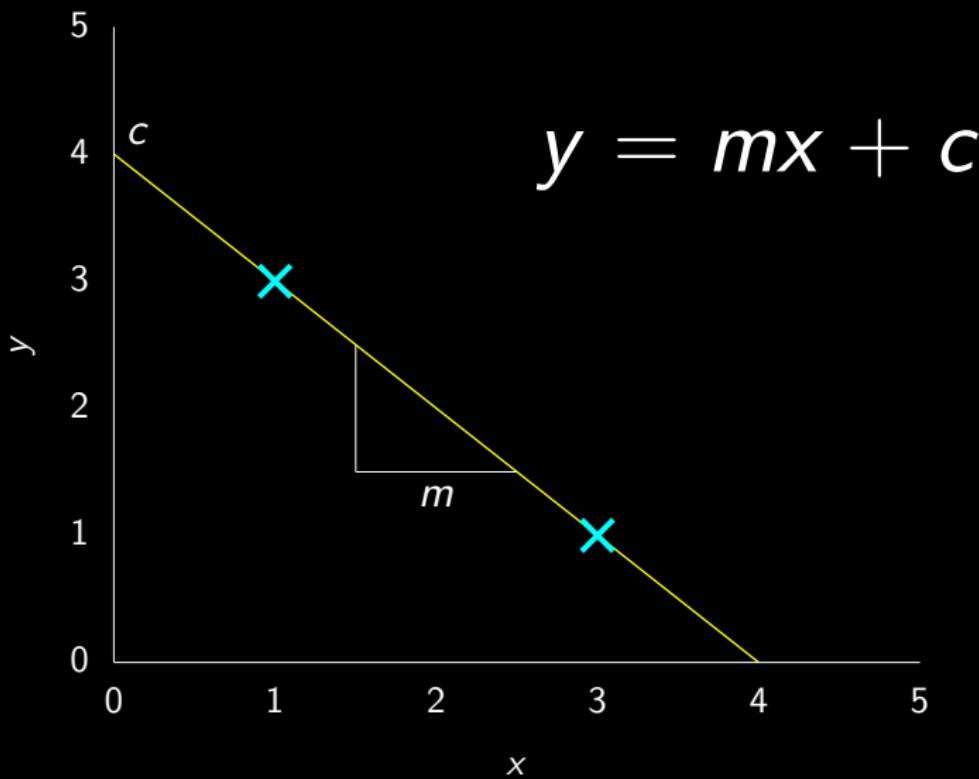
not
100 °
0 °
cold

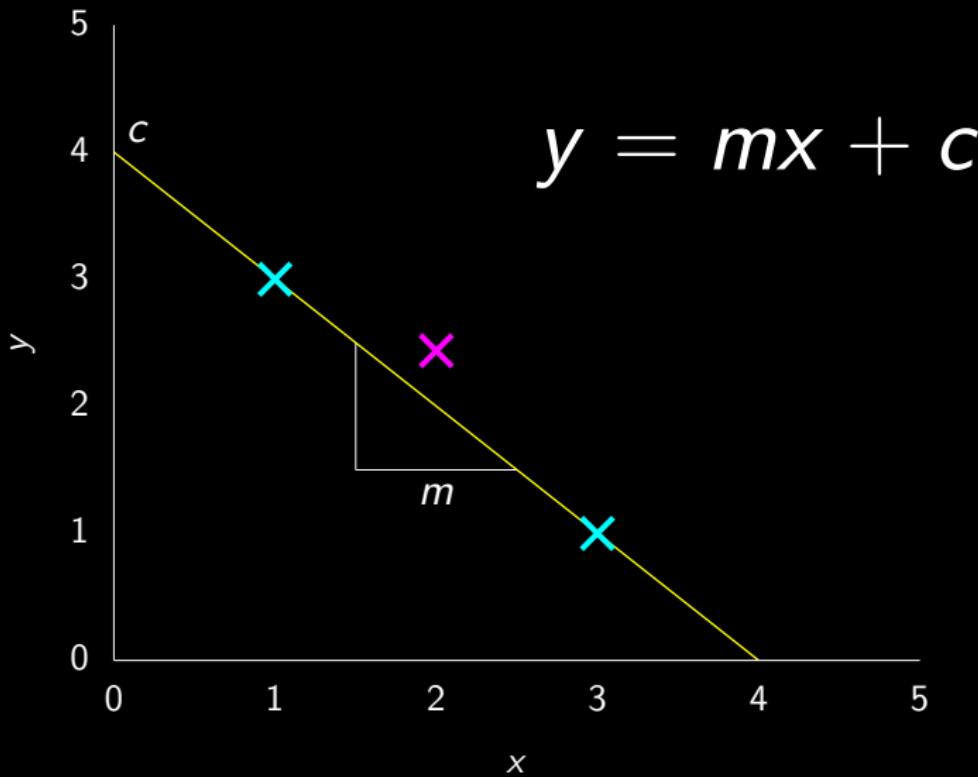


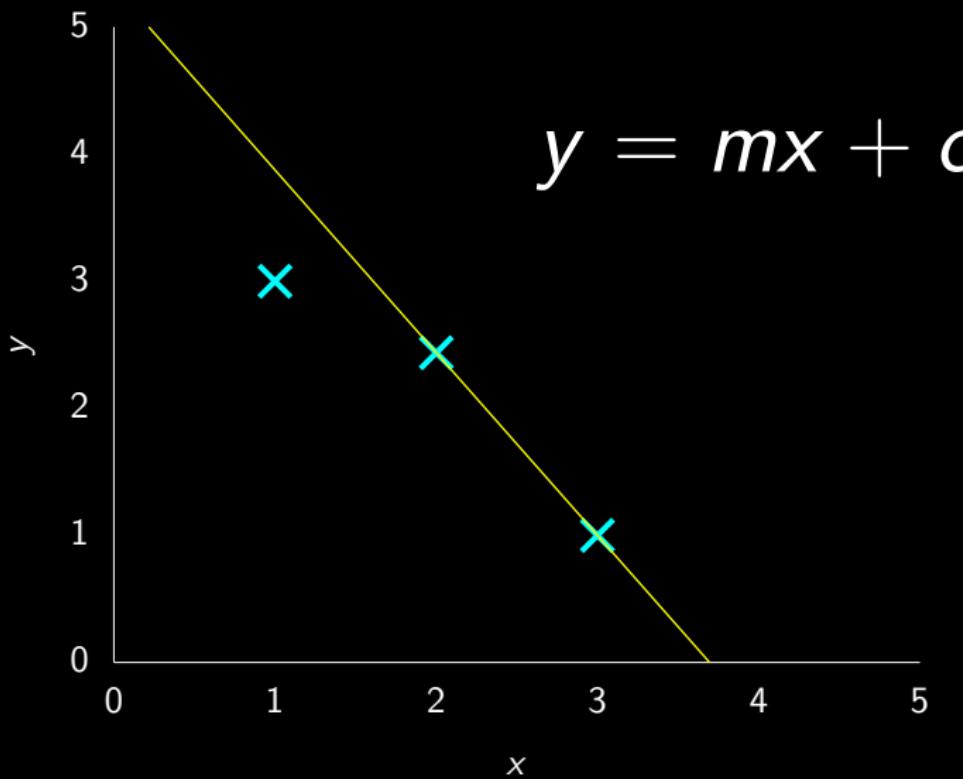
$$y = mx + c$$



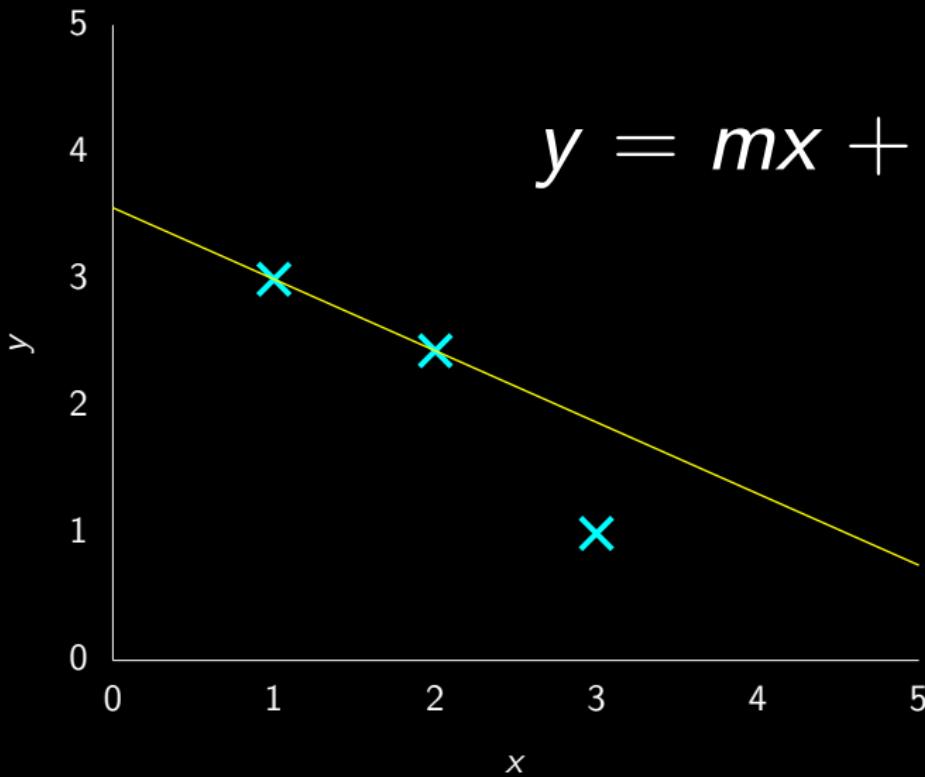


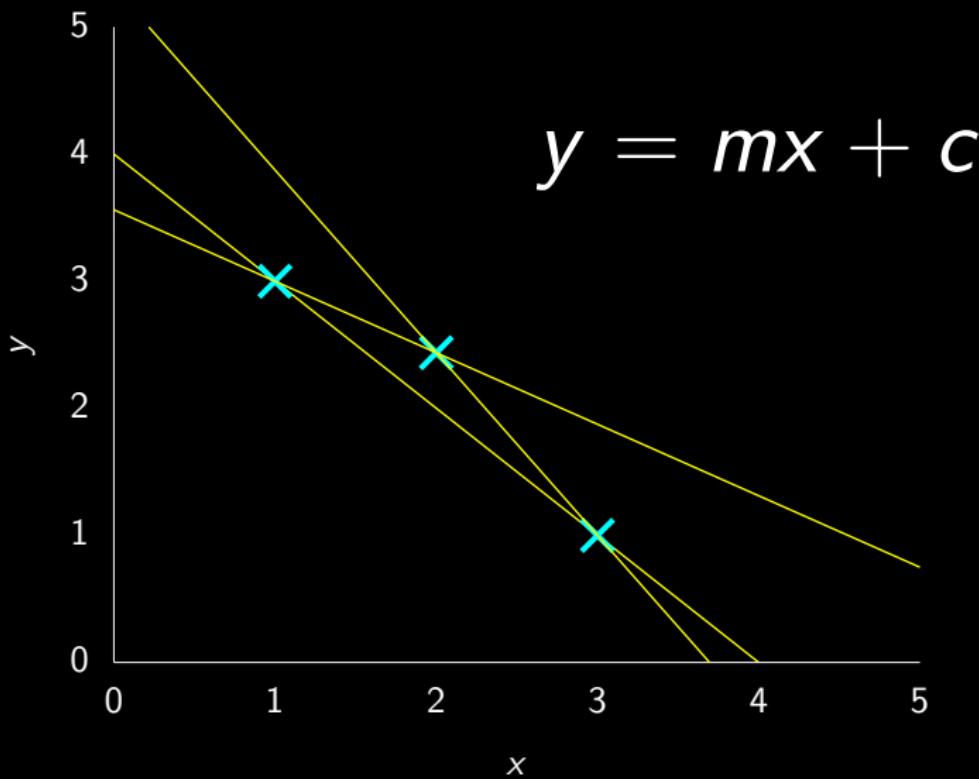






$$y = mx + c$$





$$y = mx + c$$

point 1: $x = 1, y = 3$

$$3 = m + c$$

point 2: $x = 3, y = 1$

$$1 = 3m + c$$

point 3: $x = 2, y = 2.5$

$$2.5 = 2m + c$$

$$y = mx + c + \epsilon$$

point 1: $x = 1, y = 3$

$$3 = m + c + \epsilon_1$$

point 2: $x = 3, y = 1$

$$1 = 3m + c + \epsilon_2$$

point 3: $x = 2, y = 2.5$

$$2.5 = 2m + c + \epsilon_3$$



other, we say that its choice is an effect without a cause. It is then, says Leibnitz, the blind chance of the Epicureans. The contrary opinion is an illusion of the mind, which, losing sight of the evasive reasons of the choice of the will in indifferent things, believes that choice is determined of itself and without motives.

We ought then to regard the present state of the universe as the effect of its anterior state and as the cause of the one which is to follow. Given for one instant an intelligence which could comprehend all the forces by which nature is animated and the respective situation of the beings who compose it—an intelligence sufficiently vast to submit these data to analysis—it would embrace in the same formula the movements of the greatest bodies of the universe and those of the lightest atom; for it, nothing would be uncertain and the future, as the past, would be present to its eyes. The human mind offers, in the perfection which it has been able to give to astronomy, a feeble idea of this intelligence. Its discoveries in mechanics and geometry, added to that of universal gravity, have enabled it to comprehend in the same analytical expressions the past and future states of the system of the world. Applying the same method to some other objects of its knowledge, it has succeeded in referring to general laws observed phenomena and in foreseeing those which given circumstances ought to produce. All these efforts in the search for truth tend to lead it back continually to the vast intelligence which we have just mentioned, but from which it will always remain infinitely removed. This tendency, peculiar to the human race, is that which renders it superior to animals; and their progress

choice is determined of itself and without motives.

We ought then to regard the present state of the universe as the effect of its anterior state and as the cause of the one which is to follow. Given for one instant an intelligence which could comprehend all the forces by which nature is animated and the respective situation of the beings who compose it—an intelligence sufficiently vast to submit these data to analysis—it would embrace in the same formula the movements of the greatest bodies of the universe and those of the lightest atom; for it, nothing would be uncertain and the future, as the past, would be present to its eyes. The human mind ~~offers~~ in the perfection which it has



w.ted.com/talks/neil_burgess_how_your_brain_tells_you_where_you

height: "The day will come when, by study pursued through several ages, the things now concealed will appear with evidence; and posterity will be astonished that truths so clear had escaped us." Clairaut then undertook to submit to analysis the perturbations which the comet had experienced by the action of the two great planets, Jupiter and Saturn; after immense calculations he fixed its next passage at the perihelion toward the beginning of April, 1759, which was actually verified by observation. The regularity which astronomy shows us in the movements of the comets doubtless exists also in all phenomena.

The curve described by a simple molecule of air or vapor is regulated in a manner just as certain as the planetary orbits; the only difference between them is that which comes from our ignorance.

Probability is relative, in part to this ignorance, in part to our knowledge. We know that of three or a greater number of events a single one ought to occur; but nothing induces us to believe that one of them will occur rather than the others. In this state of indecision it is impossible for us to announce their occurrence with certainty. It is, however, probable that one of these events, chosen at will, will not occur because we see several cases equally possible which exclude its occurrence, while only a single one favors it.

The theory of chance consists in reducing all the events of the same kind to a certain number of cases equally possible, that is to say, to such as we may be equally undecided about in regard to their existence, and in determining the number of cases favorable to the event whose probability is sought. The ratio of

shows us in the movements of the comets doubtless exists also in all phenomena. .

The curve described by a simple molecule of air or vapor is regulated in a manner just as certain as the planetary orbits; the only difference between them is that which comes from our ignorance.

Probability is relative, in part to this ignorance, in part to our knowledge. We know that of three or a



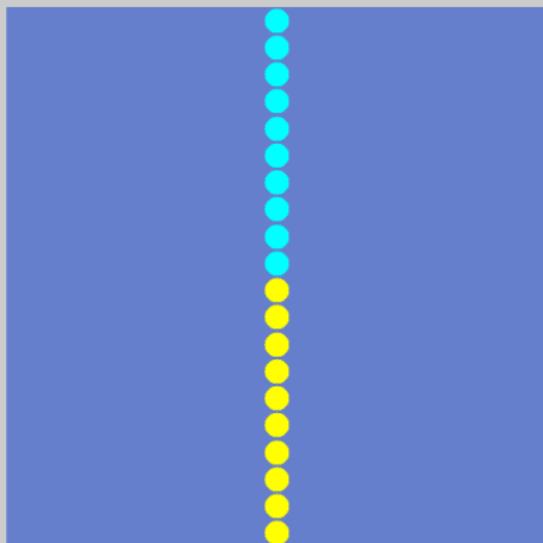
DANIEL BERNOVLLIVS

*Med. D. Professor honorarius Academicie Imper.
Petropolitanae, Anatomiae et Botanicae P. P. O. in
Academia Basiliensi.*

Nat. d. 29. Ian. A. S. R. M. DCC.

→ Billiards

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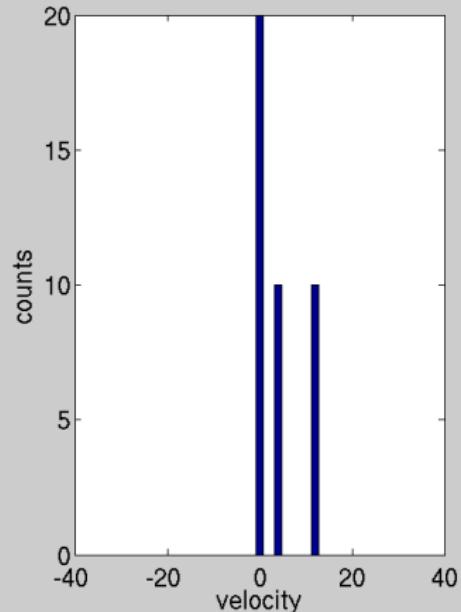


ARROWS

Pause

Instant Y

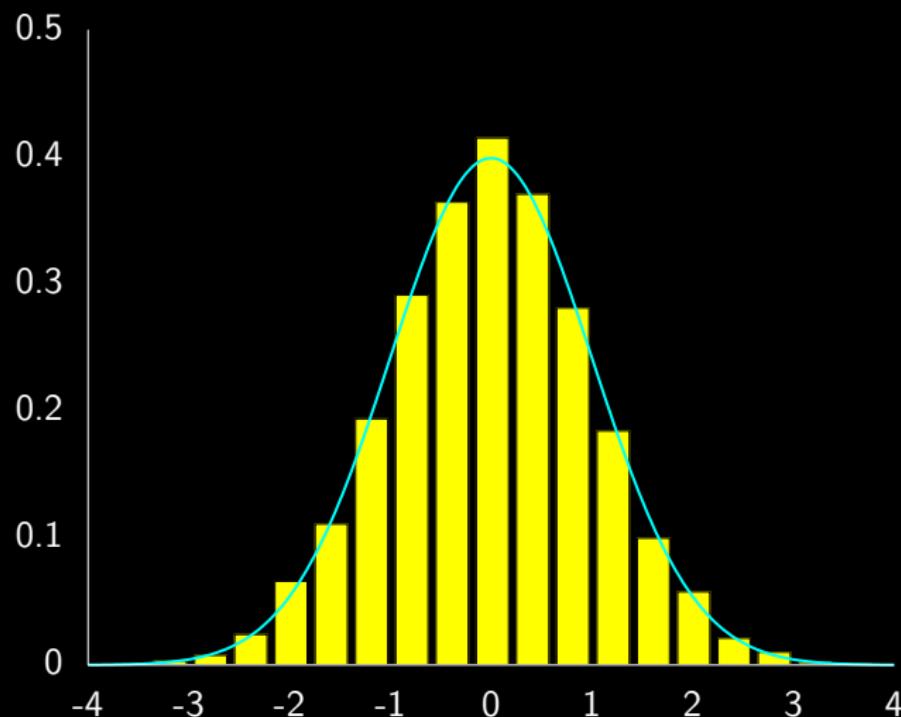
Exit

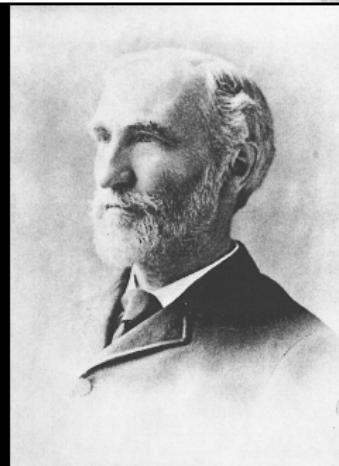


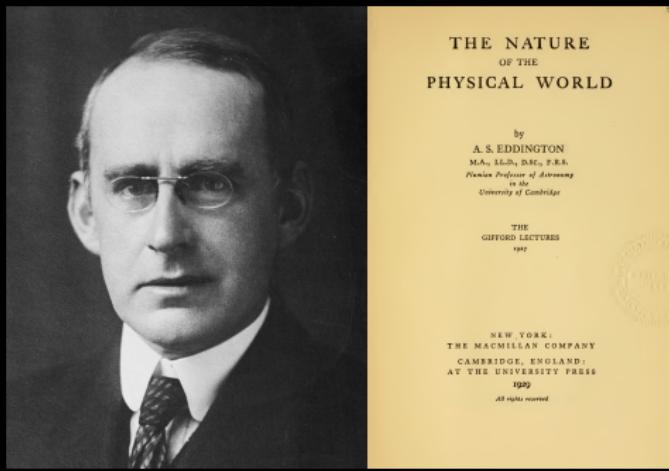
Class of graphics object

UIContextMenu

uicontextmenu object associated with the **uicontrol**



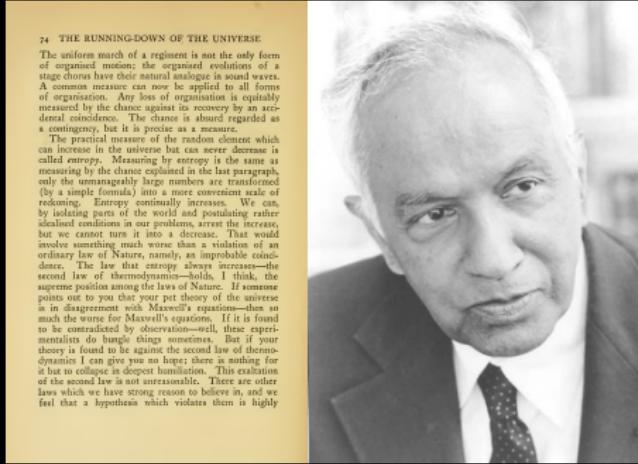




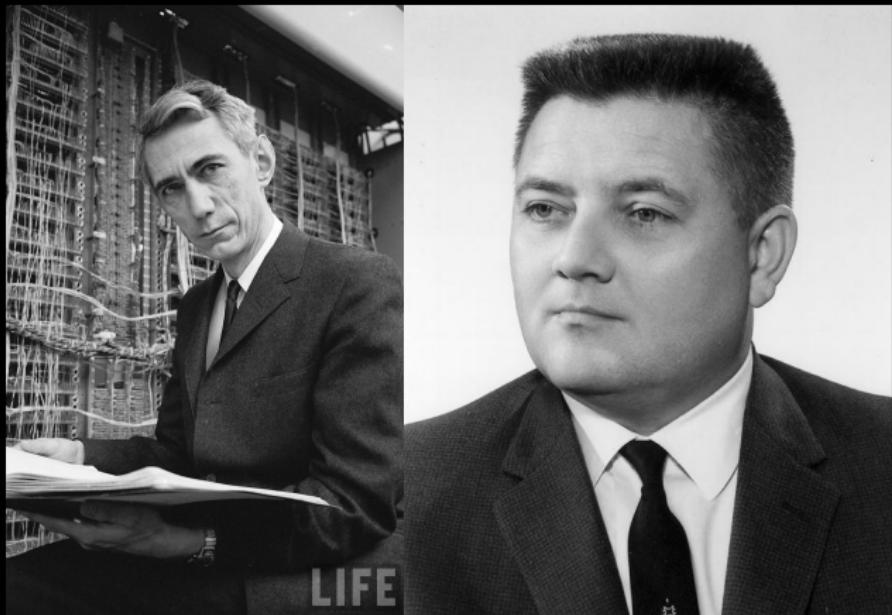
74 THE RUNNING-DOWN OF THE UNIVERSE

The uniform march of a regiment is not the only form of organized motion; the organized evolutions of a stage chorus have their natural analogue in sound waves. A common measure can now be applied to all forms of organized motion. Any loss of organization is easily measured by the change against its recovery by an accidental coincidence. The change is absurd regarded as a contingency, but it is precise as a measure.

The principle of the random element which can be found in the universe and can never decrease is called *entropy*. Measuring by entropy the same as by the change explained in the last paragraph, only a unimaginably large number are transformed (by a single transformation) into a more or less state of reckoning. Entropy continually increases. We can, by isolating parts of the world and postulating rather idealized conditions in our postulations, arrest the increase, but we cannot turn it into a decrease. This would involve something much worse than a violation of an ordinary law of Nature, namely, an improbable coincidence. The fact that entropy always increases—the second law of thermodynamics—occupies the supreme position among the laws of Nature. If someone points out to you that your pit theory of the universe is in disagreement with Maxwell's equations—then so much the worse for your pit theory. If it's not in disagreement and to be contradicted by observation—well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics, it can give you no hope; there is no room for it in a hot college classroom. This violation of the second law is not unreasonable. There are other laws which have strong reason to believe in, and we feel that a hypothesis which violates them is highly



ordinary law of Nature, namely, an improbable coincidence. The law that entropy always increases—the second law of thermodynamics—holds, I think, the supreme position among the laws of Nature. If someone points out to you that your pet theory of the universe is in disagreement with Maxwell's equations—then so much the worse for Maxwell's equations. If it is found to be contradicted by observation—well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation. This exaltation





http://videolectures.net/aispds08_kappen_easop/

ball

nell@stefano: ~

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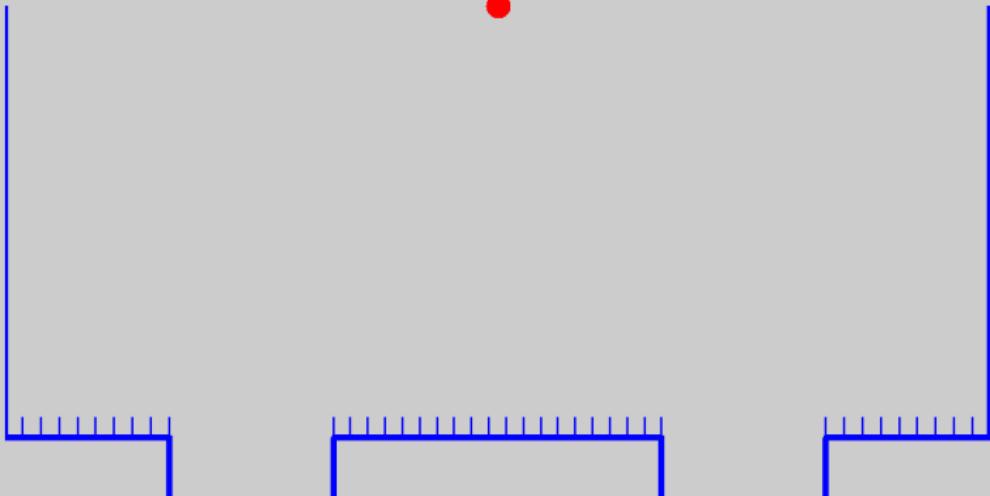
nell@stefano: ~

Kappenball

Score: 0

Average: -

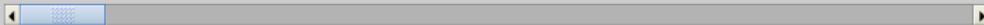
Energy: 0



Pause

Reset

Exit



	Class of graphics object
UIContextMenu	UIContextMenu object associated with the uicontrol

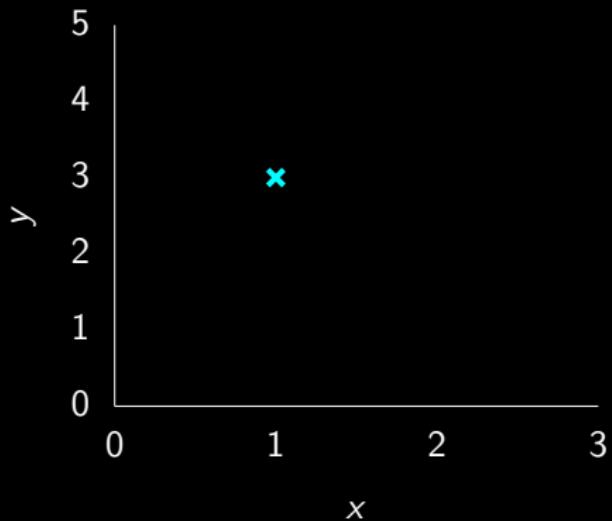




Underdetermined System

What about two unknowns and
one observation?

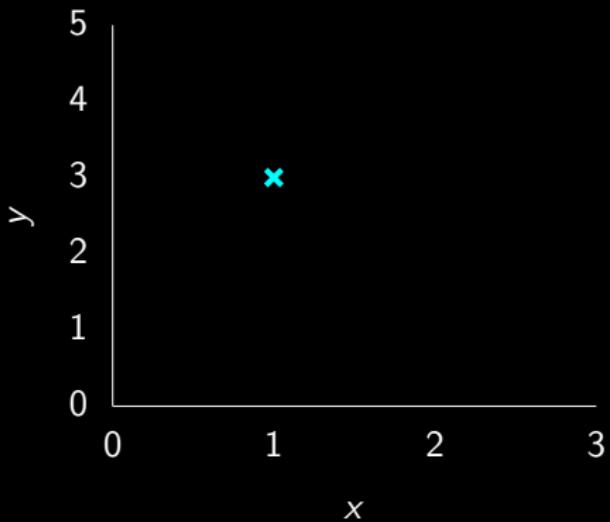
$$y_1 = mx_1 + c$$



Underdetermined System

Can compute m given c .

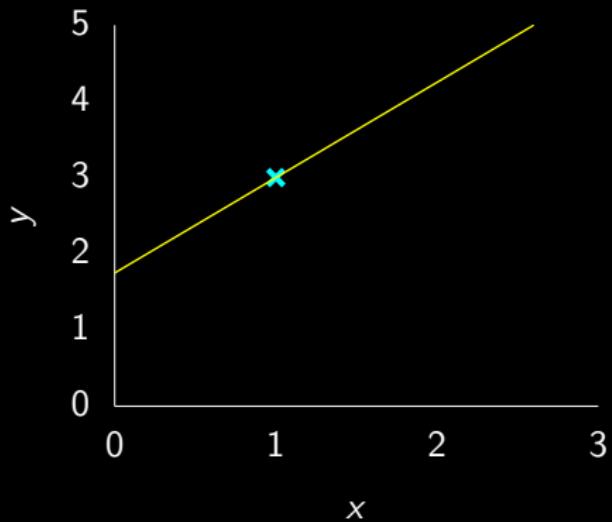
$$m = \frac{y_1 - c}{x}$$



Underdetermined System

Can compute m given c .

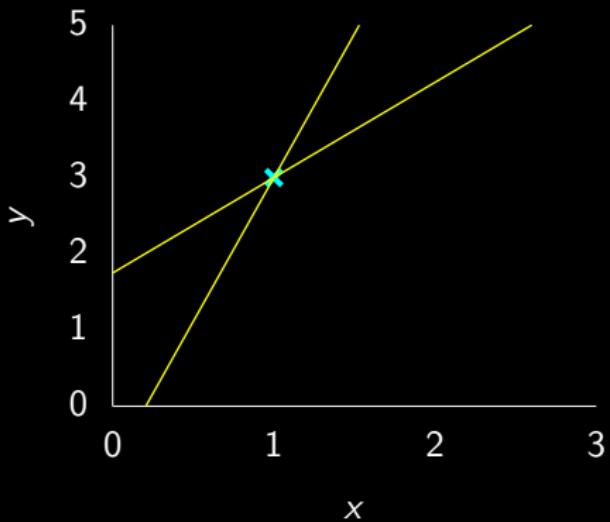
$$c = 1.75 \implies m = 1.25$$



Underdetermined System

Can compute m given c .

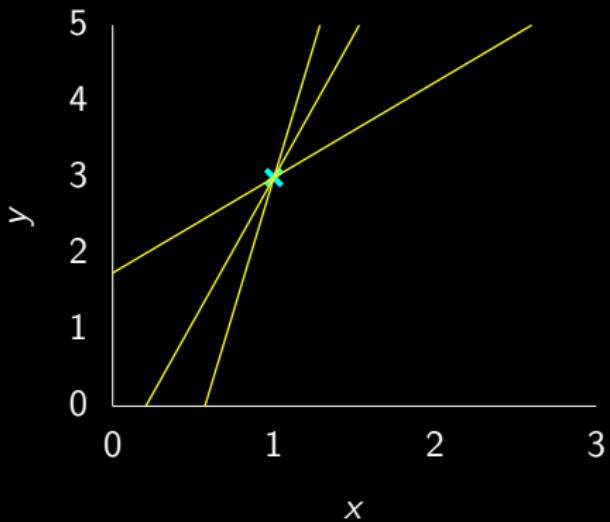
$$c = -0.777 \implies m = 3.78$$



Underdetermined System

Can compute m given c .

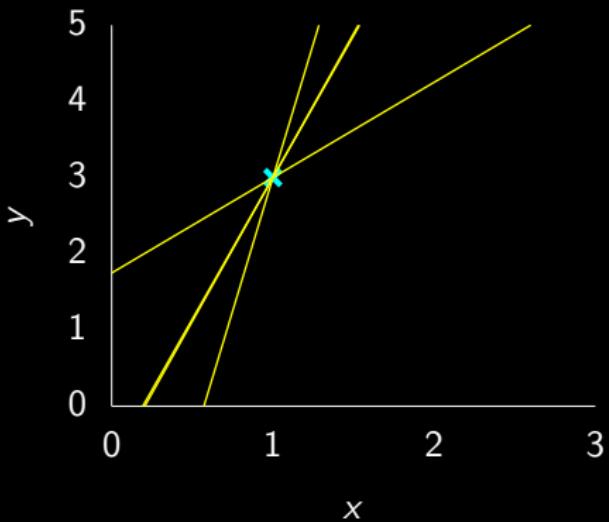
$$c = -4.01 \implies m = 7.01$$



Underdetermined System

Can compute m given c .

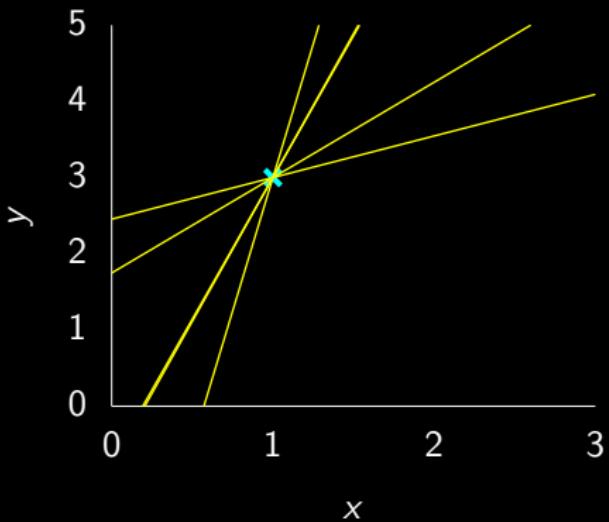
$$c = -0.718 \implies m = 3.72$$



Underdetermined System

Can compute m given c .

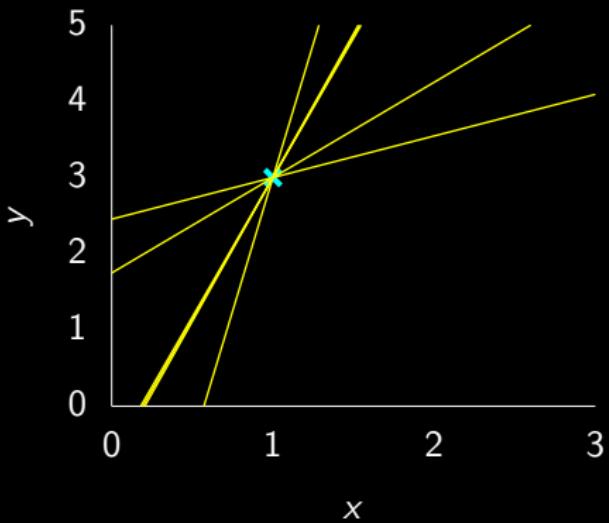
$$c = 2.45 \implies m = 0.545$$



Underdetermined System

Can compute m given c .

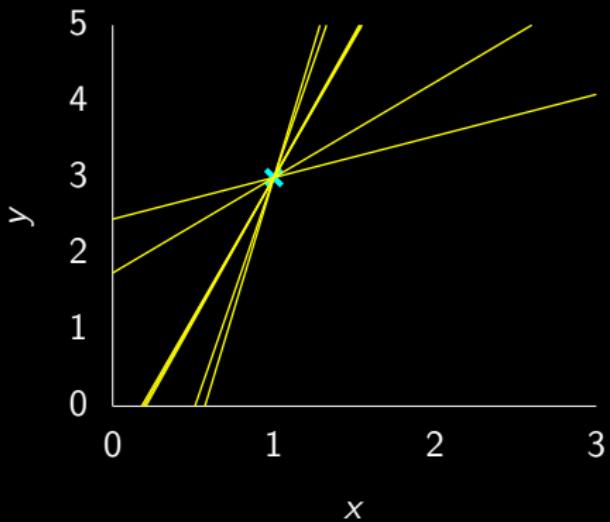
$$c = -0.657 \implies m = 3.66$$



Underdetermined System

Can compute m given c .

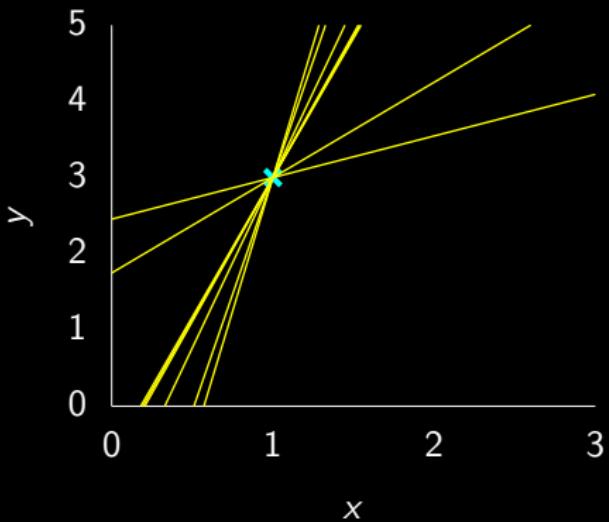
$$c = -3.13 \implies m = 6.13$$



Underdetermined System

Can compute m given c .

$$c = -1.47 \implies m = 4.47$$



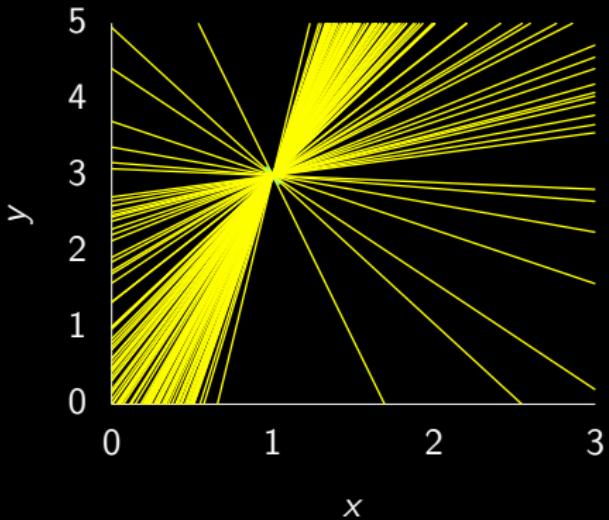
Underdetermined System

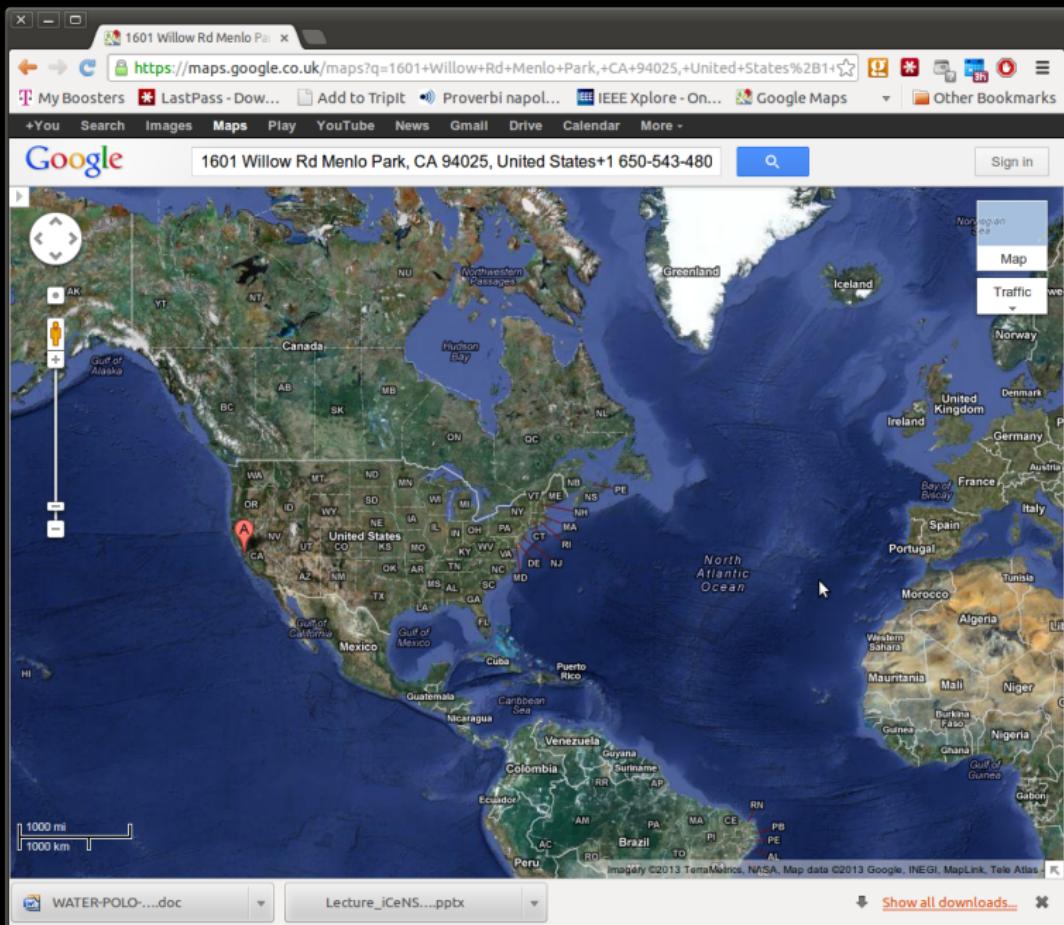
Can compute m given c .

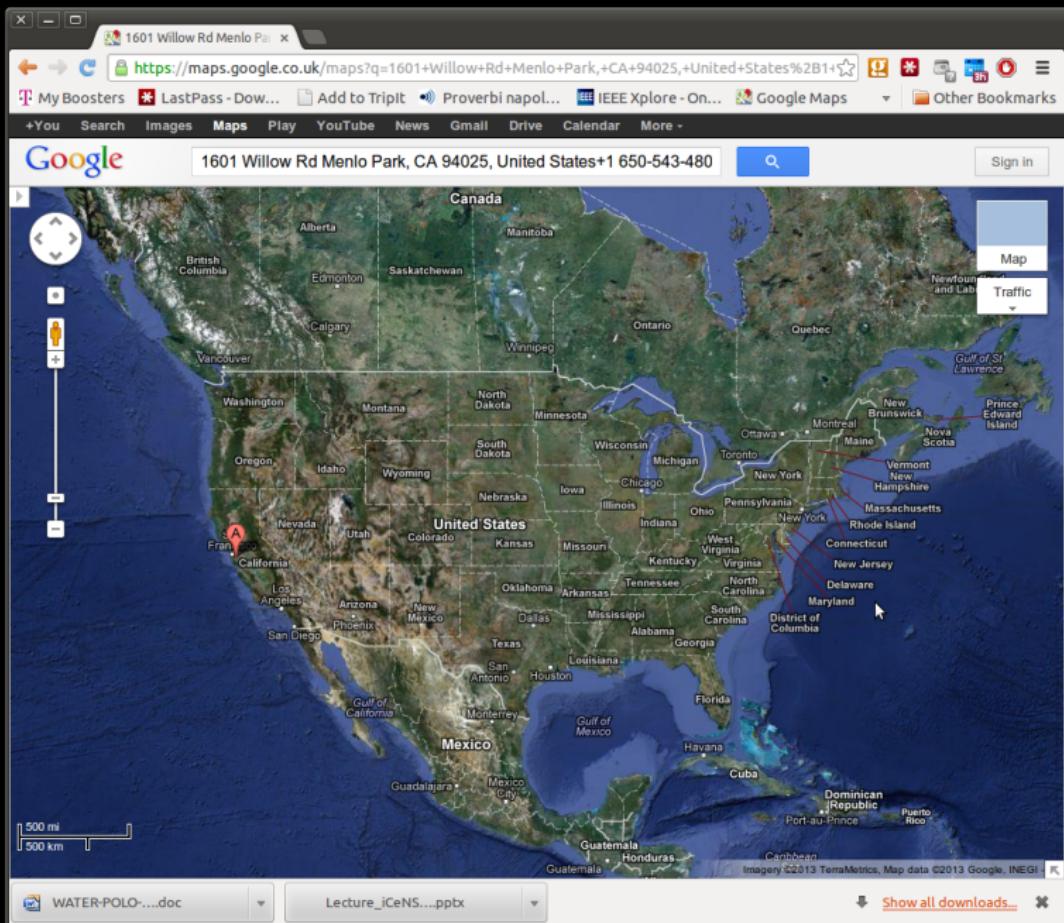
Assume

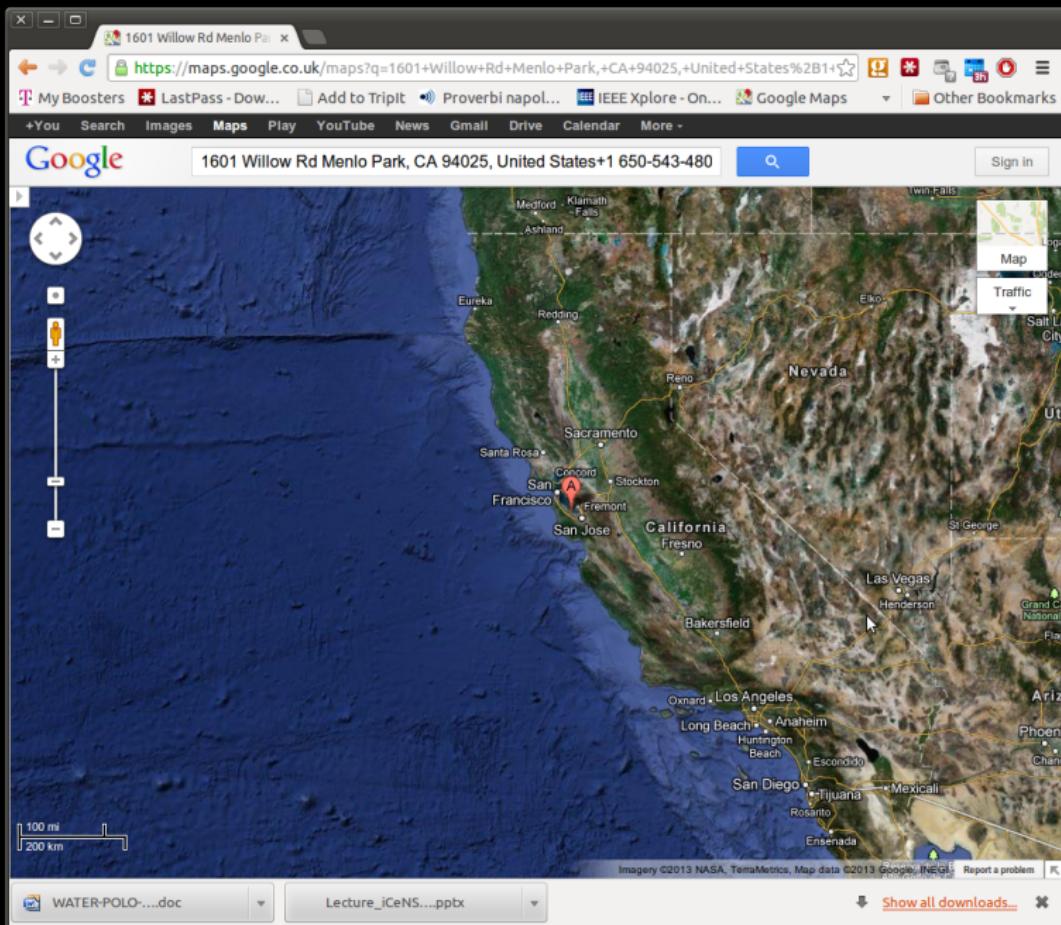
$$c \sim \mathcal{N}(0, 4),$$

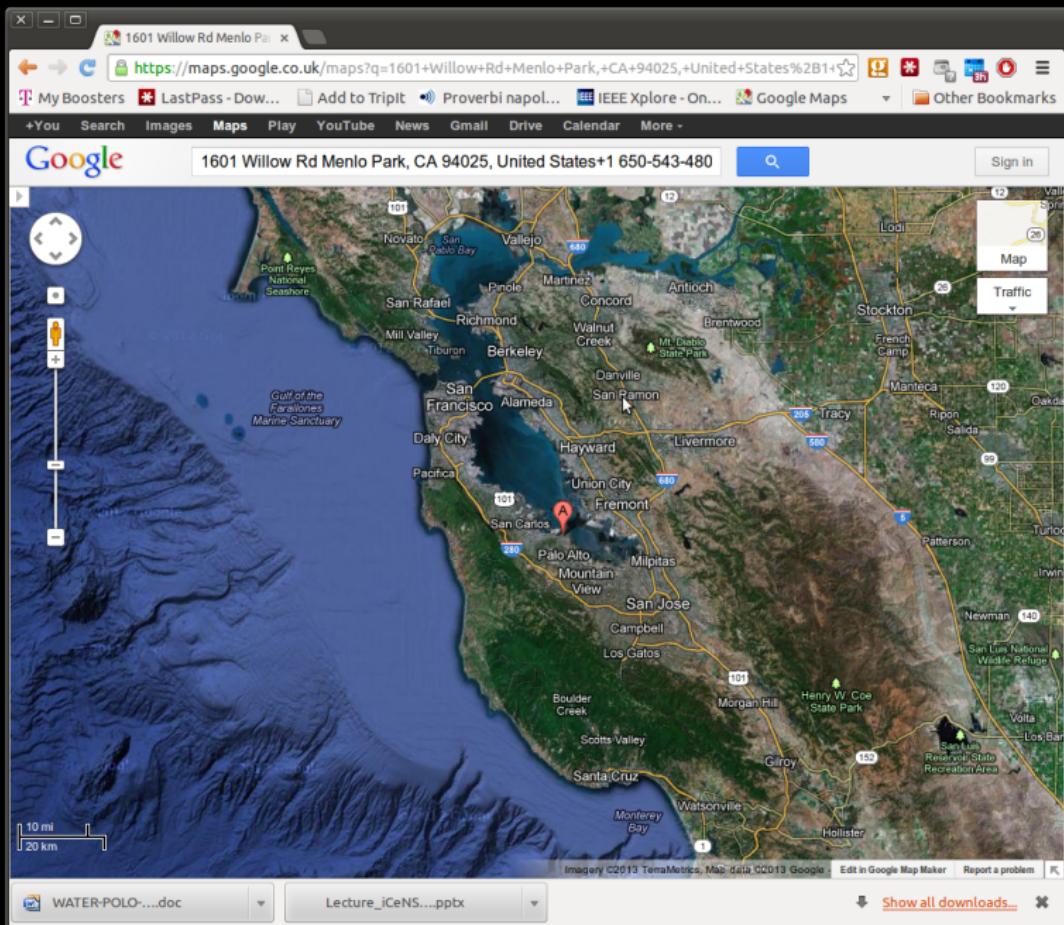
we find a distribution of solutions.

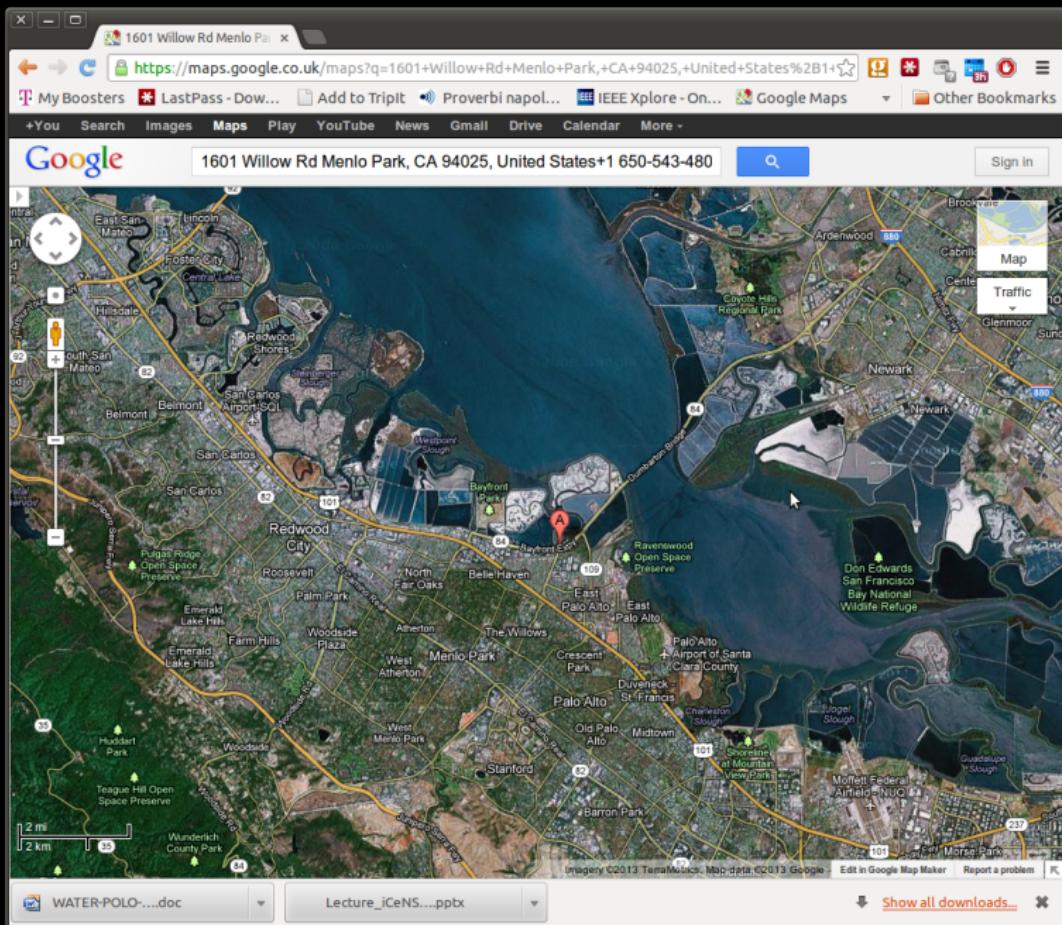


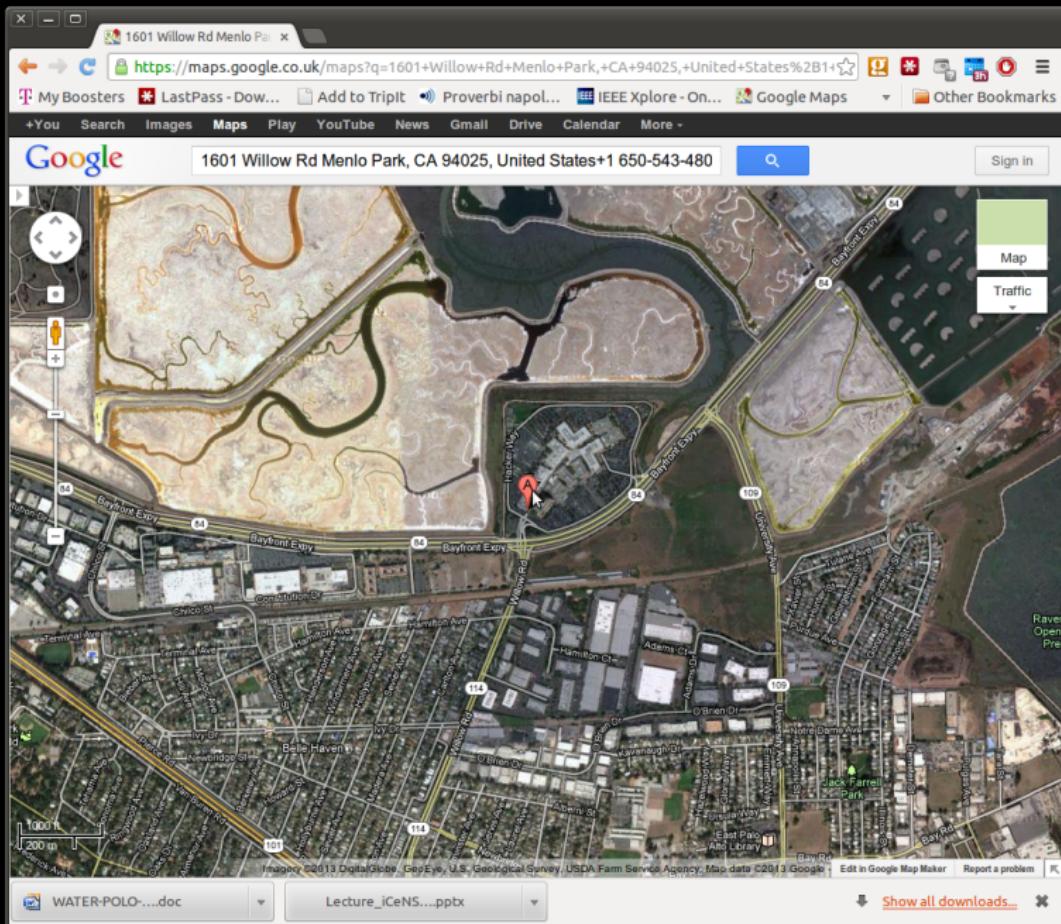


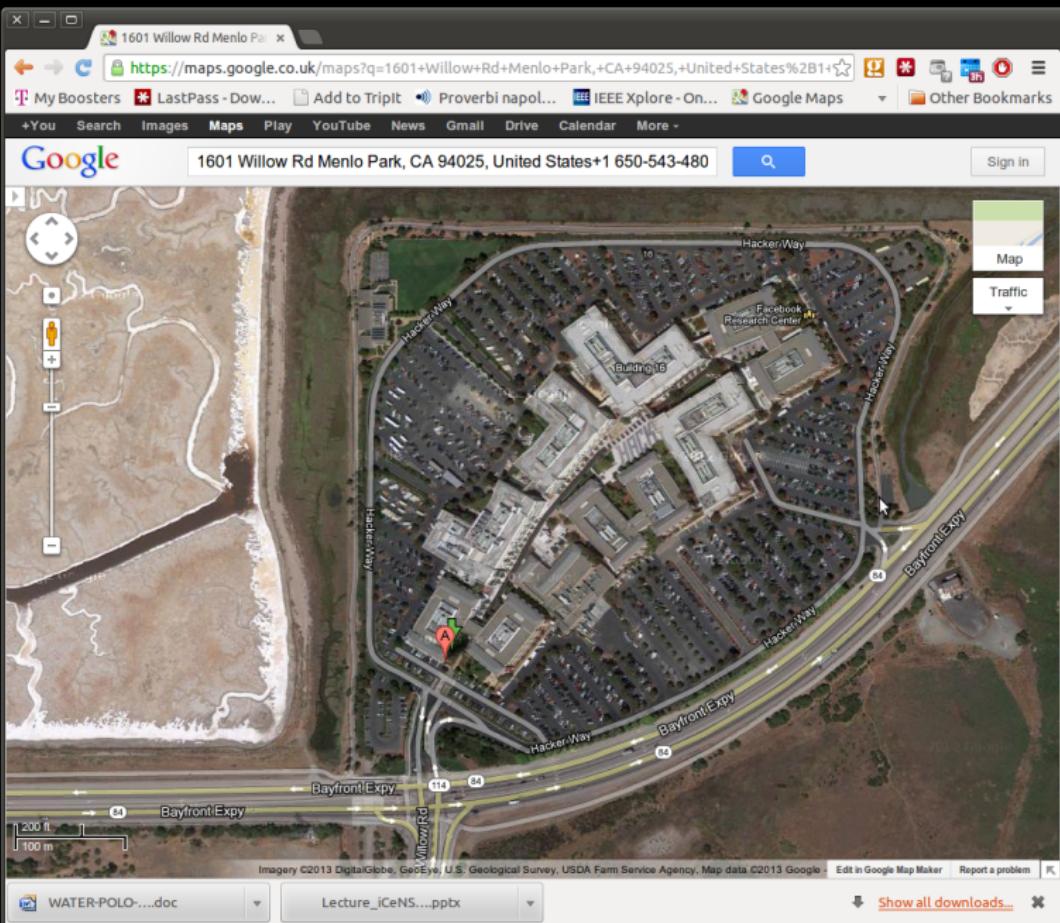


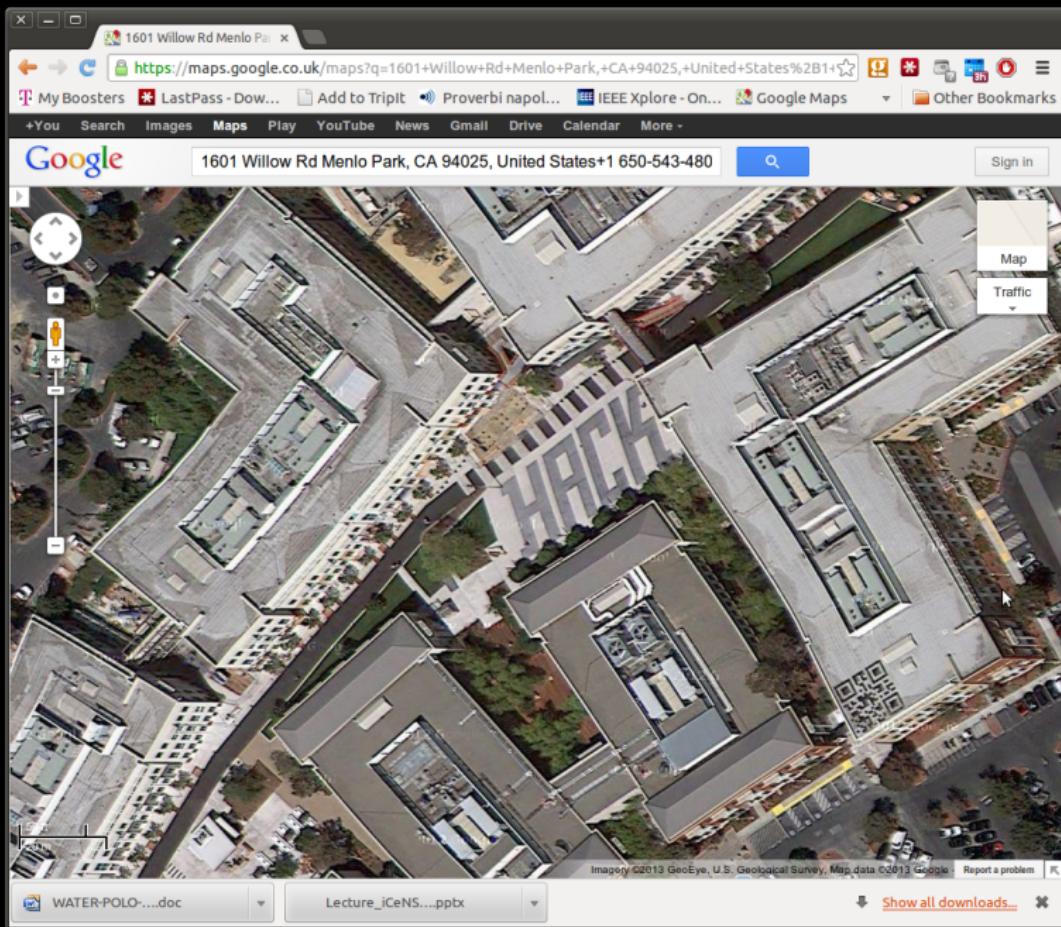


















Change Cover

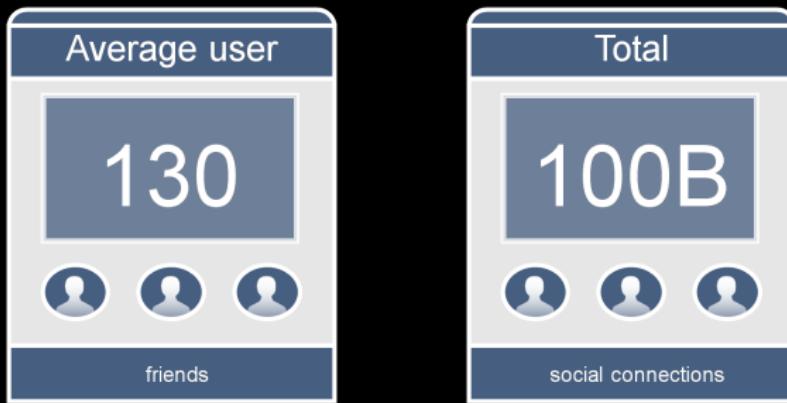
Joaquin Quiñonero Candela

[Update Info](#) [Activity Log 6](#) [*](#)

Works at Facebook
Studied at Technical University of Denmark
Lives in Palo Alto, California
Married to Ines Koch

About Friends 523 Photos 73 Map 133 Likes 79





www.facebook.com/lars?ref=pb

Lars Backstrom

Neil Lawrence

Now
2012
2011
2010
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Lars Backstrom

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