A energia escura e o Congresso

13 de dezembro de 2015 okinouchi 6 comments

How to Build a Dark Energy Detector

Posted: 25 Jan 2010 09:10 PM PST

All the evidence for dark energy comes from the observation of distant galaxies. Now physicists have worked out how to spot it in the lab

The notion of dark energy is peculiar, even by cosmological standards.

Cosmologists have foisted the idea upon us to explain the apparent accelerating expansion of the Universe. They say that this acceleration is caused by energy that fills space at a density of 10^-10 joules per cubic metre.

What's strange about this idea is that as space expands, so too does the amount of energy. If you've spotted the flaw in this argument, you're not alone. Forgetting the law of conservation of energy is no small oversight.

What we need is another way of studying dark energy, ideally in a lab on Earth. Today, Martin Perl at Stanford University and Holger Mueller down the road at the University of California, Berkeley, suggest just such an experiment

The dark energy density might sound small but Perl and Mueller point out that physicists routinely measure fields with much smaller energy densities. For example an electric field of 1 Volt per metre has an energy density of 10^-12 joules per cubic metre. That's easy to measure on Earth.

Of course there are some important differences between an electric field and the dark energy field that make measurements tricky. Not least of these is that you can't turn off dark energy. Another is that there is no known reference against which to measure it.

That leaves the possibility of a gradient in the dark energy field. If there is such a gradient, then it ought to be possible to measure its effect and the best way to do this is with atom interferometry, say Perl and Mueller.

Atom interferometry measures the phase change caused by the difference in two trajectories of an atom in space. So if a gradient in this field exists it should be possible to spot it by cancelling out the effects of all other forces. Perl and Mueller suggest screening out electromagnetic forces with conventional shields and using two atom interferometers to cancel out the the effect of gravitational forces.

That should allow measurements with unprecedented accuracy. Experiments with single atom interferometers have already measured the Earth's gravitational pull to an accuracy of 10^-9. The double interferometer technique should increase this to at least 10^-17.

That's a very exciting experiment which looks to be within reach with today's technology.

There are two potential flies in Perl and Mueller's ointment. The first is that the nature of dark energy is entirely unknown. If it exists and if there is a gradient, it is by no means certain that dark energy will exert a force on atoms at all. That will leave them the endless task of trying to place tighter and tighter limits on the size of a non-existent force.

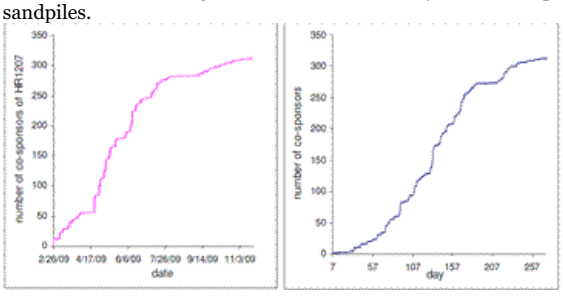
The second is that some other unknown force will rear its head in this regime and swamp the measurements. If that happens, it's hard to imagine Perl and Mueller being too upset. That's the kind of discovery that ought to put a smile on any physicists face.

Ref:**arxiv.org/abs/1001.4061**: Exploring The Possibility Of Detecting Dark Energy In A Terrestrial Experiment Using Atom Interferometry

To Understand Congress, Just Watch the Sandpile

Posted: 24 Jan 2010 09:10 PM PST

The behavior of Congress can be modeled by the same process that causes avalanches in sandpiles.



What does it take for a resolution in Congress to achieve sizeable support? It's easy to imagine that the support of certain influential representatives is crucial because of their skill in the cut and thrust of political bargaining.

Flavio Aristone em Obtiuário: Robert Lee Zimmerman

okinouchi em Neurose religiosa e misantropia ateísta

Frank W. em Neurose religiosa e misantropia ateísta

okinouchi em Caetano Veloso fala sobre Marina, Serra, Dilma e Aécio

rubens rodrigues behar em Caetano Veloso fala sobre Marina, Serra, Dilma e Aécio

Selecionar o mês

Page Rank 4/10 PRchecker.info

Resenha: Farei meu destino, de Miguel Carqueija

A TEORIA QUE NÃO MORRERIA

Sobre a seleção sexual em favor dos machos beta (e gama?)

Um paper importante sobre evidências do Multiverso

Livro Projeto Mulah de Tróia levou 25 anos para ser publicado

LDC - ABC Anel de Blogs Científicos

Blogs de Ciência (PT)

Projeto Haaan

Science Blogs Brasil

SEMCIÊNCIA

Suggest Ideas

WordPress Blog

Not so, say Mikhail Simkin and Vwani Roychowdhury at the University of California, Los Angeles. It turns out that the way a particular resolution gains support can be accurately simulated by the avalanches that occur when grains of sand are dropped onto each other to form a pile.

Simkin and Roychowdhury begin their analysis with a study of resolution HR1207 and a plot of the number of co-sponsors it received against time early last year. This plot is known in mathematics as a Devil's staircase–it consists of long periods without the addition of any new co-sponsors followed by jumps when many new co-sponsors join during a single day. "One might have suspected that the biggest steps of the staircase are due to joining of a highly influential congressman bringing with himself many new co-sponsors which he had influenced," say Simkin and Roychowdhury.

That's uncannily similar to the way in which avalanches proceed in a a model of sandpiles developed by Per Bak, Chao Tang and Kurt Wiesenfeld in 1988. Perhaps Congress can be modelled in a similar way, reason Simkin and Roychowdhury.

Their model assumes that the roles of sand grains is played units of political pressure. They assume that there is a network of influence in Congress through which representatives exert political pressure on each other (just as sand grains exert forces on each other through the network of contacts between them in the pile). When the pressure on representatives reaches a threshold, they co-sponsor the resolution and this, in turn, puts pressure on other member of congress to sign.

This is like the pressure that builds up in a sandpile as grains are dropped onto it. When a threshold is reached at a certain point on the pile, an avalanche occurs which redistributes the pressure to other places.

In addition, the representatives are pressured by their constituents which is analogous to dropping grains of sand at random.

There is a difference between sandpiles and congress however. Once a representative has signed, he or she cannot do it again and so take no further part in the process. Any further pressure on them is simply dissipated. So representatives cannot topple more than once, unlike sand grains which can keep on toppling as the pile gets bigger.

This is a pretty simple model but when Simkin and Roychowdhury ran it, they found that it generates a Devil's staircase that is uncannily similar to the one generated by representatives for HR1207.

Perhaps the most interesting feature is that the model assumes that all representatives have equal influence. "In our model, big steps are a result of evolution of Congress to a sort of critical state, where any congressman can trigger an avalanche of co-sponsors," say Simkin and Roychowdhury.

The pair suggest some interesting ways to follow up their work. They point out that not all resolutions in Congress get the same level of support. In their model, this is due to the amount of public pressure, ie the number of units of political pressure dropped onto the pile at random. If there is no outside pressure, the resolution will not get sizeable support in a reasonable amount of time.

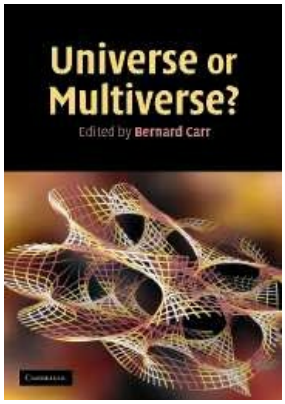
"An obvious extension to the model is to introduce political pressure against the resolution," they say, pointing out that an interesting case would be when the negative pressure exactly balances the positive. "It could explain the cases when a resolution quickly gains some support, which, however, never becomes overwhelming."

So representatives are not as important as perhaps they might imagine. Perhaps the stage should be replacing them with actual grains of sand. By Simkin and Roychowdhury's reckoning, it wouldn't make much difference.

Ref: **arxiv.org/abs/1001.3732**: Stochastic modeling of Congress

Explorando o relevo entrópico do multiverso

13 de dezembro de 2015 okinouchi 1 comment



Deriving the Properties of the Universe

Posted: 17 Jan 2010 09:10 PM PST

The properties of the universe can be derived by thinking about the origin of complexity, says a new theory.

Physicists and cosmologists have long noted that the laws of physics seem remarkably well tuned to allow the existence of life, an idea known as the anthropic principle.

It is sometimes used to explain why the laws of physics are the way they are. Answer: because if they were different, we wouldn't be here to see them.

To many people, that looks like a cop out. One problem is that this way of thinking is clearly biased towards a certain kind of carbon-based life that has evolved on a pale blue dot in an unremarkable corner of the cosmos. Surely there is a more objective way to explain the laws of physics.

Enter Raphael Bousso and Roni Harnik at the University of California, Berkeley and Stanford University respectively. They point out that the increase in entropy in any part of the Universe is a decent measure of the complexity that exists

astronomy Ateísmo Autocentrado biology blogosphere Blogs books brain cosmology Cultura evolution evolutionary psychology excitable media Ficção Científica Filosofia Física Humor journalism Marina Silva my papers Neurociências neuroscience philosophy physics politics Política popular science Psicologia psychology religion Religião science and religion science divulgation science education science fiction science philosophy scientific life self-centered Sem categoria sociophysics

there. Perhaps the anthropic principle can be replaced with an entropic one?

Today, they outline their idea and it makes a fascinating read. By thinking about the way entropy increases, Bousso and Harnik derive the properties of an average Universe in which the complexity has risen to a level where observers would have evolved to witness it.

They make six predictions about such a Universe. They say "typical observers find themselves in a flat universe, at the onset of vacuum domination, surrounded by a recently produced bath of relativistic quanta.These quanta are neither very dilute nor condensed, and thus appear as a roughly thermal background."

Sound familiar? It so happens that we live in a (seemingly) flat universe, not so long after it has become largely a vacuum and we're bathed in photons that form a thermal background. That's the cosmic infrared background that is emitted by galactic dust heated by starlight (this is different from the cosmic microwave background which has a different origin).

That's a remarkably accurate set of predictions from a very general principle. The question, of course, is how far can you run with a theory like this.

It certainly has the feel of a powerful idea. But, just like the anthropic principle, it also has the scent of circular reasoning about it: the universe is the way it is because if it were different, the complexity necessary to observe it wouldn't be here to see it.

That may not be so hard to stomach, given the power of the new idea. Even a hardened physicist would have to accept.that Bousso and Harnik have a remarkably elegant way of capturing the state of the universe.

Ref:**arxiv.org/abs/1001.1155**: The Entropic Landscape

The Entropic Landscape

Raphael Bousso, Roni Harnik

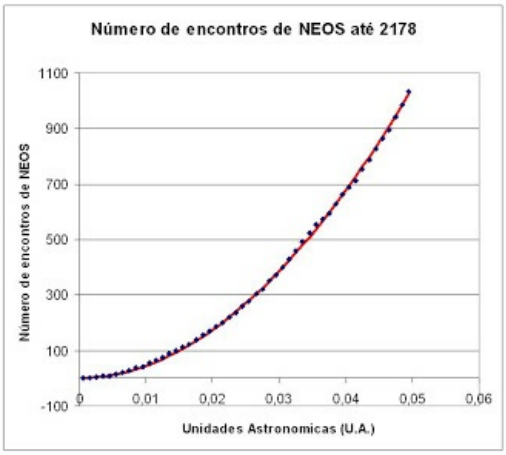
(Submitted on 8 Jan 2010 (v1), last revised 14 Jan 2010 (this version, v2))

We initiate a quantitative exploration of the entire landscape. Predictions thus far have focused on subsets of landscape vacua that share most properties with our own. Using the entropic principle (the assumption that entropy production traces the formation of complex structures such as observers), we derive six predictions that apply to the whole landscape. Typical observers find themselves in a flat universe, at the onset of vacuum domination, surrounded by a recently produced bath of relativistic quanta. These quanta are neither very dilute nor condensed, and thus appear as a roughly thermal background. Their characteristic wavelength is of order the inverse fourth root of the vacuum energy. These predictions hold for completely arbitrary observers, in arbitrary vacua with potentially exotic particle physics and cosmology. They agree with observation: We live in a flat universe at the onset of vacuum domination, whose dominant entropy production process (the glow of galactic dust) has recently produced a radiation bath (the cosmic infrared background). This radiation is marginally dilute, relativistic, and has a wavelength of order 100 microns, as predicted.

Comments:	40 pages and 3 figures, references added
Subjects:	**High Energy Physics – Theory (hep-th)**; Cosmology and Extragalactic Astrophysics (astro-ph.CO); General Relativity and Quantum Cosmology (gr-qc); High Energy Physics – Phenomenology (hep-ph)
Cite as:	**arXiv:1001.1155v2 [hep-th]**

Estatística de encontros com asteróides

13 de dezembro de 2015 okinouchi 3 comments



Tomando dados de uma tabela de encontro com NEOS (Near Earth Objects) até 2178 dada aqui, fiz um gráfico do número desses encontros (nesta janela de tempo) que apresentam uma aproximação menor que a distância D em unidades astronômicas. Em outras palavras, qual a probabilidade de se ter um encontro menor que D neste período.

Encontrei que essa probabilidade é proporcional à D^2 (uma parábola), aproximadamente. Na verdade, a curva em vermelho é proporcional a D^1.95.

Depois de pensar um pouco, acho que achei um argumento (estatístico e geométrico) de porque existe essa regularidade. Colocarei aqui em um update, mas deixo como um enigma para meus amigos blogueiros que gostam de física e astronomia proporem soluções.

PS: Alguém conhece um paper sobre isso?

Amor em Londres: uma aplicação prática da Equação de Drake

13 de dezembro de 2015 okinouchi 4 comments

Quem disse que a pesquisa em SETI não serve para nada?

Amor em Londres é tão raro quanto encontrar aliens, indica cálculo

da **Folha Online**
Romances podem acontecer diariamente, mas encontrar um verdadeiro amor em Londres é tão raro quanto alienígenas na galáxia, segundo divulgou um economista londrino nesta terça-feira (19).

Peter Backus, professor de economia na Universidade de Warwick, calculou que ele tem 0,00034% de chances de encontrar um amor na capital inglesa, usando a equação de Drake, que é aplicada por cientistas para determinar o número potencial de extraterrestres na nossa galáxia.

Bridget Jones -27.set.99/AP

O nome da equação provém do astrônomo e astrofísico Frank Drake, responsável por desenvolver a equação no começo dos anos 1960.

Backus, 31, vive na região central de Londres, não idealizou nada em especial na parceira ideal, pedindo apenas que ela fosse uma mulher

Casal observa peças de ouro em joalheria de Londres; cálculo prevê 0,00034% de chances de encontrar amor na capital inglesa

radicada em Londres, com idade entre 24 e 34 anos, e também com formação universitária.

“Não estou tentando ser elitista ou qualquer outra coisa”, disse sobre a exigência educacional. “Qualquer um tem preferências. Eu acho só que teríamos mais em comum.”

Reduzindo ainda mais as suas chances, ele estimou que se sentiria fisicamente atraído por apenas 5% das mulheres com todos estes critérios.

Isso significa que há por volta de 10,5 mil mulheres no Reino Unido que preenchem todos os critérios de Backus, disse ele –há por volta de 10 mil civilizações com potencial de comunicação que podem existir na Via Láctea, de acordo com a equação Drake.

Então apenas 0,14% dos londrinos e 0,017% da população britânica se enquadra nas exigências de Backus.

Mas aí a coisa se complica.

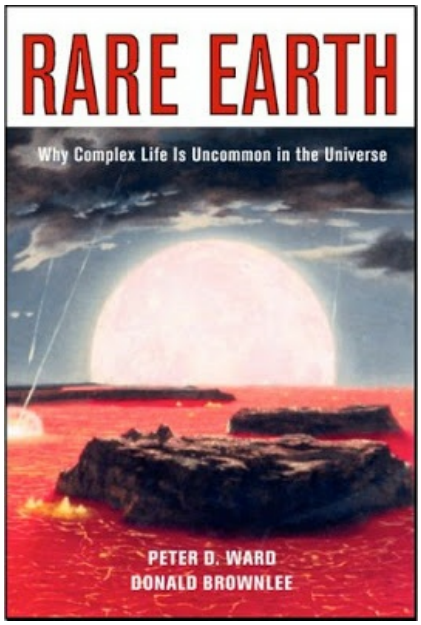
Se a mulher dos sonhos do economista é tão exigente quanto ele, suas chances de encontrar alguém que corresponda ao nível é apenas de 0,00034%.

“Há 26 mulheres no Reino Unido com as quais eu talvez tivesse um relacionamento maravilhoso. Então, em uma noite londrina, há 0,00034% de chances de encontrar uma dessas pessoas especiais”, diz ele.

“Isso é uma em 285 mil chances. Nada formidável.”

Astrobiologia Computacional

13 de dezembro de 2015 okinouchi Reply



Numerical Testing of The Rare Earth Hypothesis using Monte Carlo Realisation Techniques

Duncan H. Forgan (1), Ken Rice (1) ((1) SUPA, Institute for Astronomy, University of Edinburgh)

(Submitted on 11 Jan 2010)

The Search for Extraterrestrial Intelligence (SETI) has thus far failed to provide a convincing detection of intelligent life. In the wake of this null signal, many "contact pessimistic" hypotheses have been formulated, the most famous of which is the Rare Earth Hypothesis. It postulates that although terrestrial planets may be common, the exact environmental conditions that Earth enjoys are rare, perhaps unique. As a result, simple microbial life may be common, but complex metazoans (and hence intelligence) will be rare. This paper uses Monte Carlo Realisation Techniques to investigate the Rare Earth Hypothesis, in particular the environmental criteria considered imperative to the existence of intelligence on Earth.

By comparing with a less restrictive, more optimistic hypothesis, the data indicates that if the Rare Earth hypothesis is correct, intelligent civilisation will indeed be relatively rare. Studying the separations of pairs of civilisations shows that most intelligent civilisation pairs (ICPs) are unconnected: that is, they will not be able to exchange signals at lightspeed in the limited time that both are extant. However, the few ICPs that are connected are strongly connected, being able to participate in numerous exchanges of signals. This may provide encouragement for SETI researchers: although the Rare Earth Hypothesis is in general a contact-pessimistic hypothesis, it may be a "soft" or "exclusive" hypothesis, i.e. it may contain facets that are latently contact-optimistic.

Comments:	13 pages, 10 figures, accepted for publication in the International Journal of Astrobiology
Subjects:	**Earth and Planetary Astrophysics (astro-ph.EP)**; Galaxy Astrophysics (astro-ph.GA)
Cite as:	**arXiv:1001.1680v1 [astro-ph.EP]**

A principal diferença entre gripe suína e gripe comum

13 de dezembro de 2015 okinouchi 4 comments

15/01/10 – 16h27 – Atualizado em 15/01/10 – 17h03

[illegible]

Números referem-se ao período entre abril e 12 de dezembro de 2009. Hospitalizações causadas pelo vírus H1N1 foram 173 mil a 362 mil.

O Centro para Controle e Prevenção de Doenças dos Estados Unidos (CDC) divulgou nesta sexta-feira (15) seu boletim de avaliação do quadro epidemiológico da nova gripe. O órgão estimou que o vírus H1N1 adoeceu entre 39 milhões a 80 milhões de americanos e levou a 173 mil a 362 mil hospitalizações. O total de mortes causadas pela influenza foi de no mínimo 7.880 e no máximo 16.460.

O boletim do CDC confirma que pessoas com menos de 65 anos são mais gravemente afetadas pela doença. Cerca de **90% das hospitalizações** estimadas e **88% das mortes** foram de americanos com **menos de 65 anos**. No caso da gripe comum, a situação é inversa: 60% das hospitalizações e 90% das mortes são de pessoas com 65 anos de idade ou mais.

Referencia para o paper da Ariadne:

Scaling in the Global Spreading Patterns of Pandemic Influenza A and the Role of Control: Empirical Statistics and Modeling

Xiao-Pu Han, Bing-Hong Wang, Chang-Song Zhou, Tao Zhou, Jun-Fang Zhu

(Submitted on 8 Dec 2009)

The pandemic of influenza A (H1N1) is a serious on-going global public crisis. Understanding its spreading dynamics is of fundamental importance for both public health and scientific researches. In this paper, we investigate the spreading patterns of influenza A and find the Zipf's law of the distributions of confirmed cases in different levels. Similar scaling properties are also observed for severe acute respiratory syndrome (SARS) and bird cases of avian influenza (H5N1). To explore the underlying mechanism, a model considering the control effects on both the local growth and transregional transmission is proposed, which shows that the strong control effects are responsible for the scaling properties. Although strict control measures for interregional travelers are helpful to delay the outbreak in the regions without local cases, our analysis suggests that the focus should be turned to local prevention after the outbreak of local cases. This work provides not only a deeper understanding of the generic mechanisms underlying the spread of infectious diseases, but also an indispensable tool to decision makers to adopt suitable control strategies.

Comments:	13 pages, 16figures
Subjects:	**Physics and Society (physics.soc-ph)**
Cite as:	**arXiv:0912.1390v1 [physics.soc-ph]**

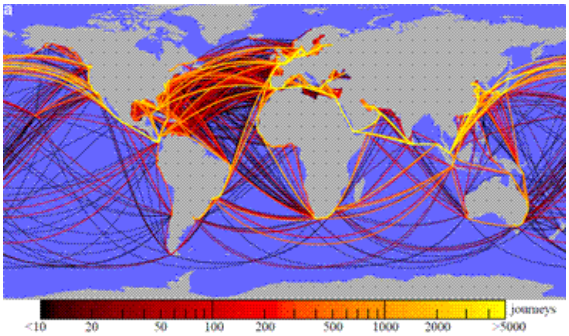
Navegar, em redes complexas, é preciso…

13 de dezembro de 2015 okinouchi Reply

The Global Shipping Network Revealed

Posted: 14 Jan 2010 09:10 PM PST

Despite carrying 90 per cent of the planet's trade, nobody has mapped the network of links between the world's ports. Until now.



The International Maritime Organization based in London estimates that 90 per cent of the world's trade is moved around the planet by sea. Given the fascination that complexity scientists have with rail, air and road networks, it seems strange that so little attention has been paid to the maritime network.

That's a wrong that's put right today by Pablo Kaluza and pals at Carl von Ossietzky University in Oldenburg, Germany. These guys have used the itineraries of 16,363 cargo ships during 2007 to construct a network of links between the world's top 951 ports. The results, at least in part, are eyebrow raising.

First, the unsurprising news. Kaluza and co show that these links form a small world network in which it is easy to move from one port to another in a small number of jumps. That's just what you'd expect given what we know about other transport networks.

However, the maritime network shows some surprising differences from the network that flight paths make between airports. For example, on average, it takes just 2.5 jumps to move from one port to another on the maritime network compared to an average of 4.4 to move between one airport and another. The maximum shortest path between ports is 8 jumps while between airports it is 15 jumps. It looks to be decidedly easier to travel the world by ship than by plane, at least in some respects.

One oddity, however, is that the maritime network is decidedly asymmetric: more than half of all ports are linked in only one direction, meaning that cargo ships do not routinely make round trip journeys between ports.

Perhaps most interesting of all is that different types of ship move in different patterns. Kaluza and co study three types of ship: container ships, bulk dry carriers and oil tankers. While container ships tend to follow regular schedules, the movement of bulk dry carriers and oil tankers is much less regular. That's because their routes are determined by the price of the commodities they carry and which vary enormously. Bulk dry carriers and oil tankers are also more likely to sail empty.

That's important because it gives a unique insight into the pattern of world trade. But there is another reason too.

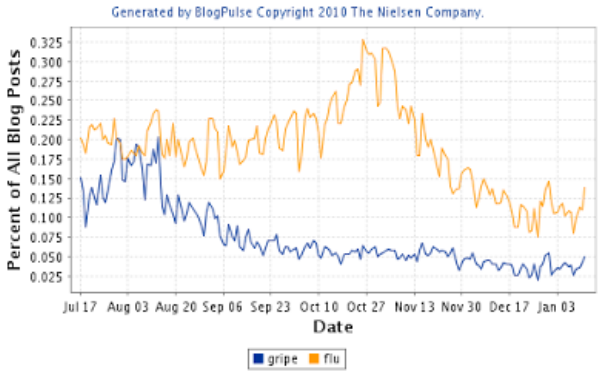
One of the most significant methods of cross species invasion is from water sucked into ships' ballast tanks in one part of the world and discharged in another; a particularly important factor when ships sail empty.

So the new network map should give marine biologists an insight into how bioinvasion occurs and what steps they can take to tackle it.

Ref: **arxiv.org/abs/1001.2172**: The complex network of global cargo ship movements

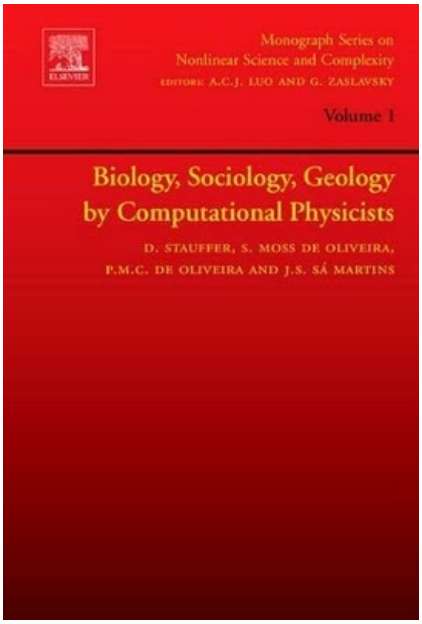
Gripe Suína: Picos epidêmicos no BlogPulse

13 de dezembro de 2015 okinouchi Reply



Novas metáforas físicas em Economia

13 de dezembro de 2015 okinouchi Reply



Parodiando Engels, "todo economista vivo é escravo de um físico morto". A questão não é se novas idéias e conceitos físicos podem ser aplicados às ciências econômicas e sociais, mas por que os velhos conceitos da física newtoniana ("equilíbrio", "forças" econômicas, "tensão" social etc.) permanecem no discurso sócio-econômico.

The (unfortunate) complexity of the economy

Jean-Philippe Bouchaud

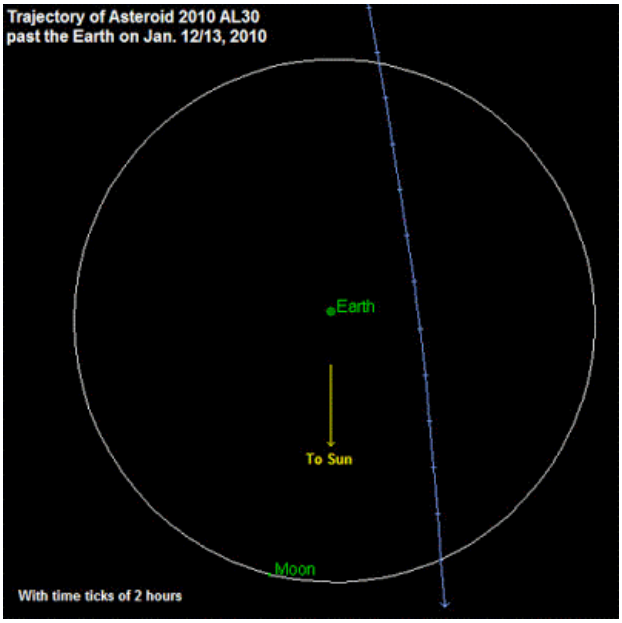
(Submitted on 6 Apr 2009)

This article is a follow-up of a short essay that appeared in Nature 455, 1181 (2008) [arXiv:0810.5306]. It has become increasingly clear that the erratic dynamics of markets is mostly endogenous and not due to the rational processing of exogenous news. I elaborate on the idea that spin-glass type of problems, where the combination of competition and heterogeneities generically leads to long epochs of statis interrupted by crises and hyper-sensitivity to small changes of the environment, could be metaphors for the complexity of economic systems. I argue that the most valuable contribution of physics to economics might end up being of methodological nature, and that simple models from physics and agent based numerical simulations, although highly stylized, are more realistic than the traditional models of economics that assume rational agents with infinite foresight and infinite computing abilities.

Subjects:	**General Finance (q-fin.GN)**; Physics and Society (physics.soc-ph)
Journal reference:	Physics World, April 2009, p.28-32
Cite as:	**arXiv:0904.0805v1 [q-fin.GN]**

Asteróide passa perto da Terra

13 de dezembro de 2015 okinouchi Reply



13/01/2010 – 10h21

Asteroide "ex-lixo espacial" passa perto da Terra nesta manhã

Um asteroide descoberto neste domingo (10) passa perto da Terra nesta quarta-feira (13), às 10h46 do horário de Brasília.

O objeto foi identificado pelos Laboratórios Lincoln do MIT (Massachussets Institute of Technology), e vai passar a cerca de 122.300 quilômetros do planeta.

Em razão de a sua órbita ser bem parecida com a da Terra no período de um ano, alguns cientistas haviam sugerido antes que o objeto seria um estágio de foguete em órbita ao redor do Sol, ou seja, um lixo espacial.

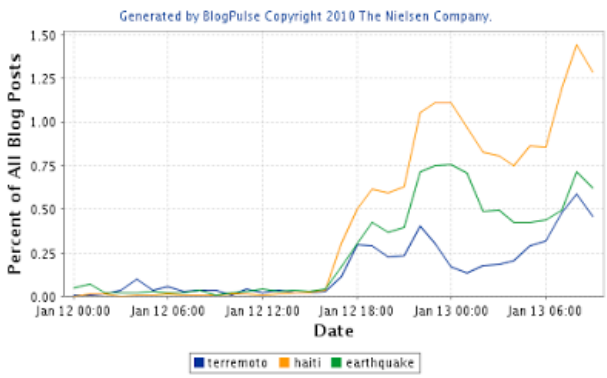
Chamado 2010 AL30, o asteroide não representaria riscos mesmo que se chocasse com a Terra.

Ele possui entre 10 e 15 metros de diâmetro, e espera-se que objetos abaixo de 25 metros como esse apenas se queimem na atmosfera do planeta.

Interessante que, com essa figura, podemos estimar a velocidade do objeto em relação à Terra. Na minha conta deu 30-40 mil Km/h.

Terremoto no Haiti, hora a hora

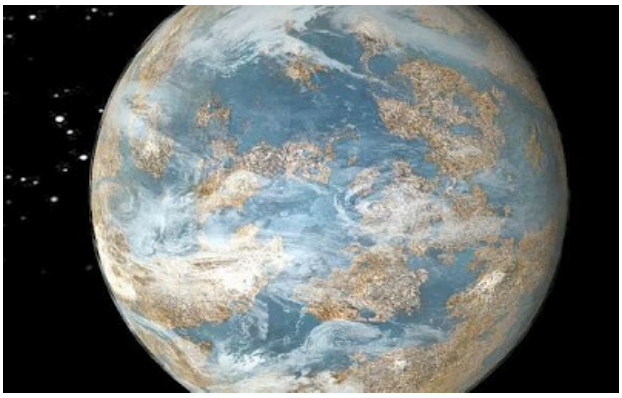
13 de dezembro de 2015 okinouchi Reply



A blogosfera é uma rede sensorial que podemos seguir hora a hora no Blogpulse. O número de posts em inglês é de cinco a seis vezes maior que em português ou castelhano (ver abaixo). Mas o número de posts sobre o Haiti é de três vezes a quase uma igualdade. Existem muitos brasileiros na missão de paz no Haiti (e foi noticiado agora que Zilda Arns morreu no terremoto). Ou seja, na blogosfera como na vida, dói mais quanto mais próximo estamos uns dos outros.

Terra a vista

13 de dezembro de 2015 okinouchi 5 comments



A menos que a Hipótese da Terra Rara esteja correta (ou seja, de que a evolução de seres multicelulares e explosões Cambrianas sejam muito raras), não vejo como escapar o Paradoxo de Fermi Local: se existem planetas habitados num raio de 1000 anos-luz daqui, por que eles ainda não nos colonizaram?

Descoberta de planeta habitável é iminente, dizem astrônomos

Dentro de quatro ou cinco anos, estimam especialistas, um planeta capaz de abrigar vida deve ser encontrado

Associated Press

WASHINGTON - Tamanho do texto? A A A

Astrônomos afirmam que estão à beira de encontrar planetas semelhantes à Terra em órbita de outras estrelas, um passo essencial para determinar se estamos sozinhos no Universo.

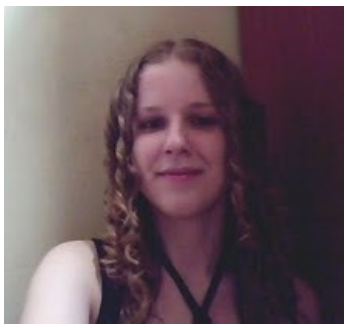
Planeta semelhante à Terra pode ser inferno vulcânico
Nasa descobre planetas gigantes fora do Sistema Solar
Cerca de 15% dos sistemas solares são como o da Terra
Moléculas orgânicas descobertas em mais um planeta distante

Um alto funcionário da Nasa e outros importantes cientistas dizem que, dentro de quatro ou cinco anos, o primeiro planeta semelhante à Terra e capaz de abrigar vida deve ser encontrado, ou talvez até já tenha sido. Um planeta com o tamanho aproximado da Terra pode até mesmo ser anunciado ainda este ano, se certas pistas detectadas por um telescópio espacial se confirmarem.

Na reunião anual da Associação de Astronomia dos Estados Unidos, cada uma das descobertas a respeito de "exoplanetas" - os localizados fora do Sistema Solar - aponta para a mesma conclusão: planetas onde a vida pode surgir provavelmente abundam, a despeito da violência do ambiente espacial, repleto de explosões, buracos negros e colisões.

Novo blog de (uma) matemática?

13 de dezembro de 2015 okinouchi 2 comments



Faz tempo que não comento sobre novos blogs de ciência aqui. Bom, como o ABC está desligado para reparos (ele parece o LHC! – alguém sabe como bloquear malwares no Joomla?), vou anotando aqui blogs que encontrei recentemente – no caso através de um comentário de sua autora Sandy, foto ao lado. O nome do blog não é muito curto, tenho medo de pensar no nome que ela irá colocar em sua tese de pós-graduação…

A V I D A É

S U R P R E S A S A G E O M E T R

O U S E J A , A C A I X I N H A É B E M M A I O R P O D O Q U E A P A R E N T A . O D E T A L H E É Q U E P O D E P I O R A R , P O R I S S O N E M T U D O E S F A Ç O A M Í N I M A I D É A D E Q U A L S E R I A A

É U M B L O G N O V O , S E U P R I M E I R O T I V E S S E P A R T I C I P A D O D O I I E W C B E B Ê !

E X E M P L O D E P O S T :

T A U T O L O G I A S

(...)

-Pessoa humana;

essa é a minha favorita. A definição mais geral da palavra “pessoa” é “ser pensante”. É total “umbiguicentrismo“ dizer que para ser pessoa é preciso ser humano. Para ser humano é preciso ser pessoa (not exactly,but…) mas a recíproca não necessariamente é verdadeira.

Outras *pérolas* das expressões populares são frases como:

“não foi nada.”- se não foi nada então foi algo??

“não há ninguem aqui.”- se não há ninguém então há alguém? (considerando que “ninguém” seja o oposto de “alguém”).

e por aí vai:

“não há ninguém melhor do que eu”;

“eu não quis dizer nada”;

“eu não sei de nada”;

O problema é que essas frases são negações de negações, mas negações de negações são “afirmações”. Em lógica o símbolo ¬representa uma negação. Utilizar essa operação duas vezes seguidas faz com que a negação seja negada, se a negação é negada então não há mais negação.

A palavra “nada” é a negação de “algo”, “niguém” é a negação de “alguém”. Se colocamos a palavra “não” em frases que usam essas palavras estamos negando a negação. Então:

-não há ninguém melhor do que eu ->há alguém melhor do que eu.

-eu não quis dizer nada -> eu quis dizer algo.

-eu não sei de nada -> eu sei de algo.

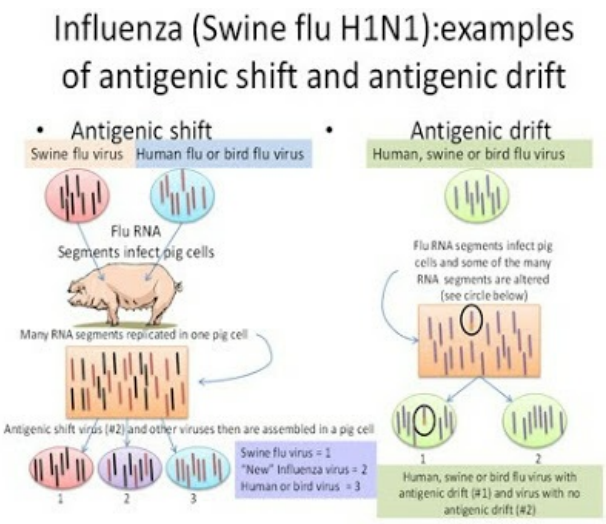
Mas o que não faz a força do hábito né ¬¬....eu não costumo não usar

essas expressões…

ps: não vou nem comentar sobre a nossa gramática….=/

É possivel ser reinfectado pela Gripe Suína?

13 de dezembro de 2015 okinouchi Reply



(Se quiser ler, clique na figura para aumentá-la)

Nos modelos epidêmicos tipo SIRS é comum assumir que o estado R equivale a um estado refratário absoluto. Mas é possível que o mesmo seja relativo, e que a reinfecção possa ocorrer nesse período. Verificar se isso têm consequências para o modelo da Ariadne…

Três chilenos são infectados duas vezes pela gripe suína

O vírus da gripe suína infectou duas vezes o mesmo paciente, como comprovou o Centro Clínico da Universidade Católica do Chile, onde foram registrados três casos com estas características.

Uma adolescente de 14 anos, uma mulher de 62 e um homem de 38 que já haviam contraído a doença novamente foram contaminados, de acordo com os especialistas Carlos Pérez, Marcela Flores e Jaime Labarca.

Nos três episódios, os doentes receberam tratamento com antiviral, após o contágio pela primeira vez e se recuperaram por completo, mas posteriormente voltaram a contrair o vírus, o que foi comprovado com os exames de PCR (Reação em Cadeia pela Polimerase), uma técnica avançada de biologia molecular.

No caso da adolescente, ela contraiu a doença 20 dias depois de receber alta, já a mulher adulta sentiu os sintomas passados 14 dias e o homem 18 dias mais tarde.

Os casos foram notificados ao Centro de Controle e Prevenção de Doenças (CDC, na sigla em inglês) dos Estados Unidos, que decidiu incluí-los na primeira edição de 2010 da revista especializada “Emerging Infectius Diseases”.

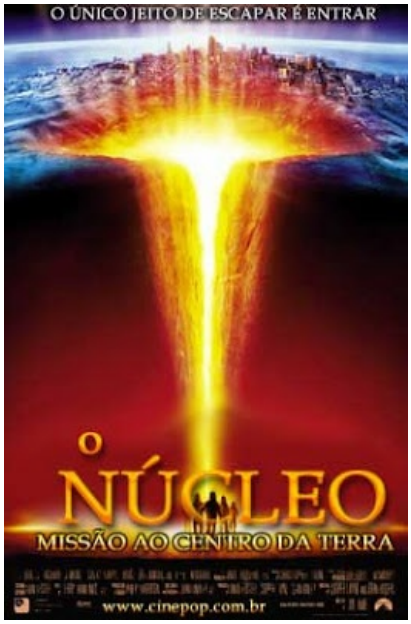
Em declarações ao jornal “La Nación”, o médico Carlos Pérez, um pelos responsáveis pela pesquisa, disse que os casos de uma nova contaminação por gripe, em qualquer de suas variantes, não são frequentes, por isso que este episódio servirá para os médicos não descartarem uma recaída em pessoas infectadas pelo vírus H1N1.

Esta situação serve de alerta ainda sobre a importância das pessoas que já contraíram a doença serem vacinadas, porque não têm garantida sua imunidade, acrescentou.

Segundo Pérez, estes foram os primeiros casos de recontágio de gripe notificados no mundo e até agora não se sabe a causa dos doentes terem contraído duas vezes a doença.

Sim, o filme é totalmente furado, mas é ótimo gancho para a divulgação científica

13 de dezembro de 2015 okinouchi Reply



Estava revendo aqui meus posts-rascunhos nunca publicados, e encontrei isto de 2007. Concordo com Takata que tal tipo de filme nunca deveria ser financiado por agências de fomento (e quem disse que o cinema de entretenimento precisa disso?), mas dado que o limão já foi produzido, não custa nada fazer a limonada…

Pois essa é toda a questão: a produção desses filmes não depende de nós. Seu uso como gancho para a divulgação científica, sim.

IV Ciclo de Palestras e Filmes Científicos do DQ

Exibição do filme: “O Núcleo – Missão ao centro da terra”

Após a exibição, o Prof. Dr. Grégoire Jean-François Demets (Departamento de Química – FFCLRP – USP) fará comentários sobre o filme.

Data: 19 de abril de 2007 (quinta-feira) – às 16h00

Local: Anfiteatro do Bloco das Exatas (sala 11 – DE)

Sinopse: Hilary Swank lidera um elenco de astros, nesta eletrizante viagem que põe o espectador no centro da mais espetacular aventura. O geógrafo Dr. Josh Keyes (Aaron Eckhart) fez uma terrível descoberta: o núcleo do Planeta Terra parou de girar. Agora o campo eletromagnético está se deteriorando e dentro de alguns meses, o planeta será destruído. Existe uma esperança: enviar Keyes e um grupo de cientistas de elite a um canal subterrâneo no centro da Terra. Enquanto o destino da humanidade oscila na corda bamba, os cientistas e a tripulação precisam fazer o inimaginável: detonar um dispositivo nuclear, para reativar o núcleo da Terra.

Informações: Secretaria do Departamento de Química – Fone: (16) 3602-4386 – e-mail: dq-secretaria@ffclrp.usp.br

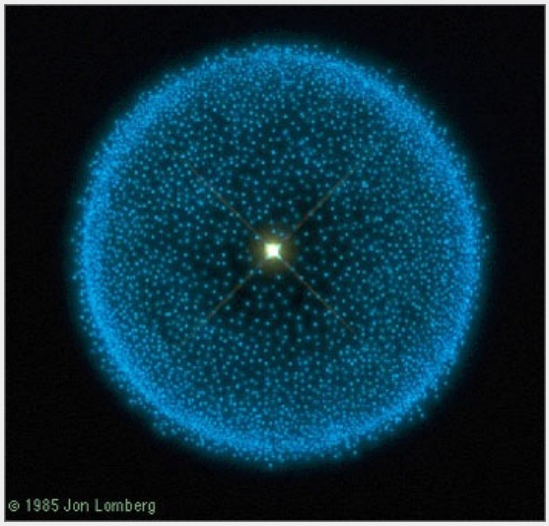
Vida e morte nas marés galácticas

13 de dezembro de 2015 okinouchi Reply

Este artigo me parece relevante também para a teoria de extinções periódicas devido às marés galácticas.

Friday, December 18, 2009

Galactic Tide May Have Influenced Life on Earth
The galactic tide is strong enough to influence Oort Cloud comets, which means it may also have helped shape our planet.



The Moon's tides have been an ever-present force in Earth's history, shaping the landscape and the lives of the creatures that inhabit it. Now there's a tantalising hint that the galactic tide may have played a significant role in Earth's past.

The work comes from Jozef Klacka at Comenius University in the Slovak Republic. He has calculated the strength of the galactic tide and its effect on the Solar System. His conclusion is that the tide is strong enough to significantly effect the orbital evolution of Oort Cloud comets.

That's a fascinating result. We've long known that the Moon's tides must have been crucial for the evolution of life on Earth. The constant ebb and flow of the oceans would have left sea life stranded on beaches, forcing adaptations that allowed these creatures to cope with conditions on land.

Astrobiologists also believe that comets played an important part in the development of life on Earth because the atmosphere and oceans were seeded, at least in part, by comets. By that way of thinking, the forces and processes that have shaped evolution stretch to the edge of the Solar System.

But if the galactic tide plays a role in sending these comets our way, then it looks as if we're part of a much larger web. Could it be that Earth and the life that has evolved here, is crucially dependent, not just on our planet, our star and our local interplanetary environment, but on the Milky Way galaxy itself?

Klacka has a lot more work to do to prove that the galactic tide plays such a role. But it might just be that the field of astrobiology has become a whole lot bigger.

Ref: arxiv.org/abs/0912.3112: Galactic Tide

Pessoas não-humanas estão chegando…

13 de dezembro de 2015 okinouchi 2 comments

Escrito em 1998, no artigo "**A Perigosa Persistência do Determinismo Social**":

Assim, minha conclusão nesta seção é a de que a "quantificação inadequada" das capacidades cognitivas (e outras capacidades humanas) nãoo precisa ser um mal em si. Ela pode muitas vezes aparecer como o único instrumento disponível para detetar os efeitos destrutivos de práticas sociais desigualitárias. Mas a antipatia de Steven Rose por este tipo de quantificação das capacidades humanas tem raízes ético-filosóficas mais profundas. Ela se baseia no receio de que quantificação, comparação com modelos animais e máquinas etc. representem um processo de degradação da dignidade humana. Se os humanos são afinal máquinas (orgânicas, complexas, mas ainda assim máquinas), o que nos impediria de tratá-los como máquinas, explorando-os e usando-os apenas para nossos fins? (mas *nossos* de quem? de outras máquinas orgânicas pertencentes às classes dominantes?)

Nas próximas seções, mostrarei que este é realmente o ponto central de toda a discussão. E que a saída deste dilema ético só poderá ocorrer pelo abandono dos preconceitos e da ojeriza humanista romântica pelas máquinas, e pelo desenvolvimento de uma nova empatia e respeito por todo tipo d sistema anti-entrópico, seja ele um animal, uma máquina (prefiro a palavra artefato) ou uma obra d arte…

January 3, 2010

Scientists say dolphins should be treated as 'nor human persons'

Dolphins

Dolphins have long been recognised as among the most intelligent of animals but many researchers had placed them below chimps

Jonathan Leake

141 COMMENTS

RECOMMEND? (227)

Dolphins have been declared the world's second most intelligent creatures after humans, with scientists suggesting they are so bright that they should be treated as "non-human persons".

Studies into dolphin behaviour have highlighted how similar their communications are to those of humans and that they are brighter than chimpanzees. These have been backed up by anatomical research showing that dolphin brains have many key features associated with high intelligence.

The researchers argue that their work shows it is morally unacceptable to keep such intelligent animals in amusement parks or to kill them for food or by accident when fishing. Some 300,000 whales, dolphins and porpoises die in this way each year.

"Many dolphin brains are larger than our own and second in mass only to the human brain when corrected for body size," said Lori Marino, a zoologist at Emory University in Atlanta, Georgia, who has used magnetic resonance imaging scans to map the brains of dolphin species and compare them with those of primates.

“The neuroanatomy suggests psychological continuity between humans and dolphins and has profound implications for the ethics of human-dolphin interactions,” she added.

RELATED INTERNET LINKS

Fight Club Live: Animal Experimentation

RELATED LINKS

Dolphins not so friendly when catching salmon

Swimmers warned as dolphin ‘turns bad’

Dolphins have long been recognised as among the most intelligent of animals but many researchers had placed them below chimps, which some studies have found can reach the intelligence levels of three-year-old children. Recently, however, a series of behavioural studies has suggested that dolphins, especially species such as the bottlenose, could be the brighter of the two. The studies show how dolphins have distinct personalities, a strong sense of self and can think about the future.

It has also become clear that they are “cultural” animals, meaning that new types of behaviour can quickly be picked up by one dolphin from another.

In one study, Diana Reiss, professor of psychology at Hunter College, City University of New York, showed that bottlenose dolphins could recognise themselves in a mirror and use it to inspect various parts of their bodies, an ability that had been thought limited to humans and great apes.

In another, she found that captive animals also had the ability to learn a rudimentary symbol-based language.

Other research has shown dolphins can solve difficult problems, while those living in the wild co-operate in ways that imply complex social structures and a high level of emotional sophistication.

In one recent case, a dolphin rescued from the wild was taught to tail-walk while recuperating for three weeks in a dolphinarium in Australia.

After she was released, scientists were astonished to see the trick spreading among wild dolphins who had learnt it from the former captive.

There are many similar examples, such as the way dolphins living off Western Australia learnt to hold sponges over their snouts to protect themselves when searching for spiny fish on the ocean floor.

Such observations, along with others showing, for example, how dolphins could co-operate with military precision to round up shoals of fish to eat, have prompted questions about the brain structures that must underlie them.

Size is only one factor. Researchers have found that brain size varies hugely from around 7oz for smaller cetacean species such as the Ganges River dolphin to more than 19lb for sperm whales, whose brains are the largest on the planet. Human brains, by contrast, range from 2lb-4lb, while a chimp’s brain is about 12oz.

When it comes to intelligence, however, brain size is less important than its size relative to the body.

What Marino and her colleagues found was that the cerebral cortex and neocortex of bottlenose dolphins were so large that “the anatomical ratios that assess cognitive capacity place it second only to the human brain”. They also found that the brain cortex of dolphins such as the bottlenose had the same convoluted folds that are strongly linked with human intelligence.

Such folds increase the volume of the cortex and the ability of brain cells to interconnect with each other. “Despite evolving along a different neuroanatomical

trajectory to humans, cetacean brains have several features that are correlated with complex intelligence," Marino said.

Marino and Reiss will present their findings at a conference in San Diego, California, next month, concluding that the new evidence about dolphin intelligence makes it morally repugnant to mistreat them.

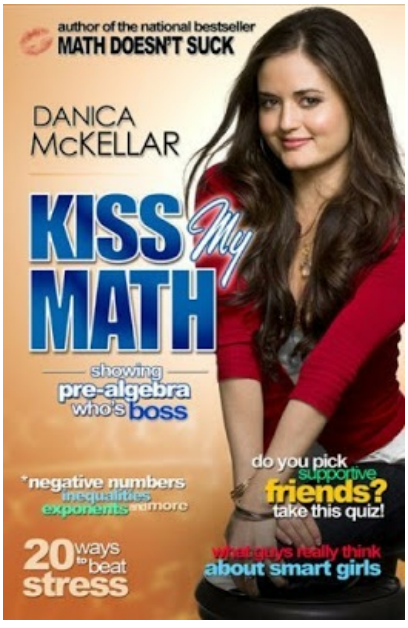
Thomas White, professor of ethics at Loyola Marymount University, Los Angeles, who has written a series of academic studies suggesting dolphins should have rights, will speak at the same conference.

"The scientific research . . . suggests that dolphins are 'non-human persons' who qualify for moral standing as individuals," he said.

Additional reporting: Helen Brooks

Danica McKellar: caçando paraquedistas

13 de dezembro de 2015 okinouchi 1 comment



No Google Analytics, meu post sobre Danica McKellar é a mais visitado. Ponto para mim ou para o Gene Reporter?

Actress and published mathematician, Danica McKellar, has joined St. Jude Children's Research Hospital® in the fight against childhood cancer as the national spokesperson for the hospital's Math-A-Thon® fund-raising program.

Math-A-Thon is a volunteer-based fundraising program for St. Jude. The program includes a free math curriculum supplement, provided by Scholastic, Inc., for grades K-8 that students complete after obtaining sponsorships from family and friends. Find out more at http://www.mathathon.org

Mais que metáforas: organismos como sociedades

13 de dezembro de 2015 okinouchi Reply

Via twitter de Ciência na Mídia (via Roberto Takata):

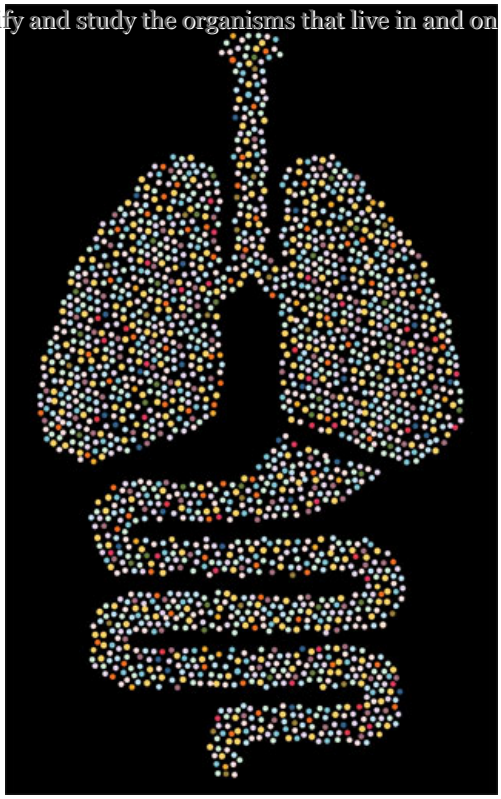
THE DEEP SYMBIOSIS BETWEEN BACTERIA AND THEIR HUMAN HOSTS IS FORCING SCIENTISTS TO ASK: ARE WE ORGANISMS OR LIVING ECOSYSTEMS?

As soon as we are born, bacteria move in. They stake claims in our digestive and respiratory tracts, our teeth, our skin. They establish increasingly complex communities, like a forest that gradually takes over a clearing. By the time we're a few years old, these communities have matured, and we carry them with us, more or less, for our entire lives. Our bodies harbor 100 trillion bacterial cells, outnumbering our human cells 10 to one. It's easy to ignore this astonishing fact. Bacteria are tiny in comparison to human cells; they contribute just a few pounds to our weight and remain invisible to us.

It's also been easy for science to overlook their role in our bodies and our health. Researchers have largely concerned themselves with bacteria's negative role as pathogens: The devastating effects of a handful of infectious organisms have always seemed more urgent than what has been considered a benign and relatively unimportant relationship with "good" bacteria. In the intestine, the bacterial hub of the body that teems with trillions of microbes, they have traditionally been called "commensal" organisms — literally, eating at the same table. The moniker suggests that while we've known for decades that gut bacteria help digestion and prevent infections, they are little more than ever-present dinner guests.

But there's a growing consensus among scientists that the relationship between us and our microbes is much more of a two-way street. With new technologies

that allow scientists to better identify and study the organisms that live in and on us, we've become aware that bacteria, though tiny, are powerful chemical factories that fundamentally affect how the human body functions. They are not simply random squatters, but organized communities that evolve with us and are passed down from generation to generation. Through research that has blurred the boundary between medical and environmental microbiology, we're beginning to understand that because the human body constitutes their environment, these microbial communities have been forced to adapt to changes in our diets, health, and lifestyle choices. Yet they, in turn, are also part of our environments, and our bodies have adapted to them. Our dinner guests, it seems, have shaped the very path of human evolution.



In October, researchers in several countries launched the International Human Microbiome Consortium, an effort to characterize the role of microbes in the human body. Just over a year ago, the National Institutes of Health also launched its own Human Microbiome Project. These new efforts represent a formal recognition of bacteria's far-reaching influence, including their contributions to human health and certain illnesses. "This could be the basis of a whole new way of looking at disease," said microbiologist Margaret McFall-Ngai at the 108th General Meeting of the American Society for Microbiology in Boston last June. But the emerging science of human-microbe symbiosis has an even greater implication. "Human beings are not really individuals; they're communities of organisms," says McFall-Ngai. It's not just that our bodies serve as a habitat for other organisms; it's also that we function with them as a collective. As the profound interrelationship between humans and microbes becomes more apparent, the distinction between host and hosted has become both less clear and less important — together we operate as a constantly evolving man-microbe kibbutz. Which raises a startling implication: If being *Homo sapiens* through and through implied a certain authority over our corporeal selves, we are now forced to relinquish some of that control to our inner-dwelling microbes. Ironically, the human ingenuity that drives us to understand more about ourselves is revealing that we're much less "human" than we once thought. (continue a ler aqui).

Darwinismo Quantico e analogias biológicas

13 de dezembro de 2015 okinouchi Reply

Talvez um dos problemas associados com o Darwinismo ao longo de sua história seja que ele representa um algoritmo tão geral que analogias e metáforas podem ser feitas em profusão, com maior ou menor fidelidade ao conceito original. O Darwinismo Social começa como uma metáfora e termina como ideologia.

E essa ideologia de forma alguma está morta: você pode vê-la com facilidade na seção de cartas

da revista Veja, por exemplo, onde os emergentes são “ajustados (fit) socialmente” e os pobres sãc “desajustados (unfit) socialmente, são pobres por que têm muitos filhos, e assim continuam a espalhar a pobreza” (como se existisse o gene da pobreza!).

O mais engraçado é que, em termos Darwinistas, quem tem muitos filhos é que são os ajustados (alto fitness) enquanto que quem tem poucos filhos têm baixo fitness biológico. E é aí que reside todo o dilema da estabilização da população mundial: os países com taxa demográfica estável ou decrescente têm baixo fitness, não importa sua riqueza. Israel vai enfrentar a bomba demográfica palestina em 20 anos. A Europa vai se islamizar, e o Japão vai definhar frente à China. Os pobres herdarão a Terra… E mesmo o Brasil corre o risco de ficar velho antes de ficar rico.

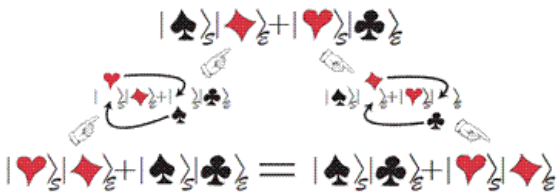
Por incrível que pareça, são os anti-Darwinistas da direita religiosa conservadora americana, com sua ênfase na família etc., que são favorecidos pelo fitness Darwinista. O avanço demográfico desse pessoal é que produziu a revolução conservadora de Reagan a Bush. Não está claro que Obama e os democratas consigam resistir a esse efeito demográfico no longo prazo…

O artigo abaixo não tem nada a ver com isso. É apenas um exemplo de como a Física e a Biologia trocam metáforas e analogias entre si…

Thursday, January 07, 2010

Quantum Darwinism and the Nature of Reality

Quantum Darwinism can explain the nature of classical reality. But is it really a form of natural selection or just an imposter?



Quantum darwinism is an extraordinary idea that was unleashed last year by the physicist by Wojciech Zurek at Los Alamos National Labs in New Mexico.

It’s main claim is that it explains the quantum-classical transition: why macroscopic physics obeys classical rules while the quantum world obeys the seemingly weird laws of quantum mechanics. That makes it a Big Idea.

So how does it work? Zurek’s way into this problem is to think about the role of the environment in quantum mechanics. For other quantum physicists, the environment has never been anything more than a nuisance. Consider a quantum object in isolation and the quantum information it contains can survive forever. But place it in the real world and this quantum information leaks into the environment, destroying the system under study.

Zurek takes different view. He thinks of the environment as an information channel and the properties of this channel are the key to understanding quantum darwinism.

All macroscopic measuring machines get their information through this channel. For example, at this very moment you are intercepting a fraction of the photons emitted by a screen. But we can never observe all of the environment, only a small fraction of it which reveal systems of interest.

This is the essence of quantum darwinism, says Zurek. Only quantum states that can be transmitted through the environment in the right kind of way and with multiple copies, can be observed on the macroscopic scale. That rules out various kinds of quantum information. What’s left are what Zurek calls “pointer states”. These are what we observe classically.

So the classical view of the universe is determined by the states that survive transmission through the environmental information channel. Hence the darwinism: it is only possible to observe the states that are fit enough to survive this process of transmission.

But is this real survival of the fittest or just something like it? That's the question raised today by the independent researcher John Campbell.

It has long been known that Darwin's theory of natural selection can be applied in many situations. The "substrate free" version of it is called universal darwinism and is essentially an algorithm composed of three steps: replication or copying, variations amongst the copies, and selective survival of the copies determined by which variations they possess.

Campbell's conclusion is that quantum darwinism meets this criteria.

That still leaves many questiosn unanswered, of course. In his paper introducing quantum darwinism, Zurek asks: "Is Quantum Darwinism (a process of multiplication of information about certain favored states that seems to be a fact of quantum life") in some way behind the familiar natural selection? I cannot answer this question, but neither can I resist raising it."

Campbell would have us believe that they are intimately linked, although this conclusion is by no means a slam dunk.

There's plenty of inspiring work to be done here by any philosophers with a little time on their hands.

Ref: arxiv.org/abs/1001.0745: Quantum Darwinism as a Darwinian process

1 2 » Last