BELGIAN MATHEMATICAL SOCIETY

Comité National de Mathématique CNM

C W M
N

NCW Nationaal Comite voor Wiskunde

BMS-NCM NEWS: the Newsletter of the Belgian Mathematical Society and the National Committee for Mathematics

Campus Plaine c.p. 218/01,
Bld du Triomphe, B–1050 Brussels, Belgium

Website http://bms.ulb.ac.be
Newsletter F.Bastin@ulg.ac.be
Tel. F. Bastin, ULg,(32)(4) 366 94 74
Fax F. Bastin, ULg,(32)(4) 366 95 47

BMS-NCM NEWS

—

No 98, May 15, 2014

Letter from the editor

Welcome to this May edition of our Newsletter.
Have a nice summer time! The Newsletter comes back next September.

Regards, Françoise

Contents

1 News from the BMS & NCM

1.1 Future activity: November 12, 2014

The ***Fields Medal***, officially known as International Medal for Outstanding Discoveries in Mathematics, is a prize awarded to two, three, or four mathematicians not over 40 years of age at each International Congress of the International Mathematical Union (IMU), a meeting that takes place every four years. ***In August 2014, this IMU meeting will take place in Seoul, Korea.***

On Wednesday November 12, 2014, at the Academy,

the BMS and the NCM will organize some lectures around the themes of the fields medalists. Precisions will be given in August... ***Please remember this and fix the date in your agenda!***

Please note that the ***General Assembly of the BMS*** will also take place on November 12, 2014.

1.2 Bulletin of the BMS - electronic version

We remind you that it is possible to convert your paper subscription to the Bulletin of the BMS into **the electronic version of the Bulletin.** ***If you are interested, please contact Philippe Cara by e-mail*** (pcara@vub.ac.be with bms@ulb.ac.be in cc) for details.

You will receive a special "subscriber code" with which you can register for the Bulletin of the Belgian Mathematical Society at Project Euclid (http://projecteuclid.org).

2 Meetings, Conferences, Lectures

2.1 May 2014

Colloqium on Cosmology"
Wednesday May 07, 2014

On May 7, there was a colloquium on cosmology organized by UCL and KU Leuven commemorating Georges Lemaitre (born 120 years ago and former president of the BMS). See informations at the end of this newsletter.

FNRS group "Wavelets and Applications"
Thursday May 22, 2014
ULB, Campus Plaine, NO Building 9th Floor, Salle des Professeurs

- 10.00-11.00 Christina Brandt (Universität Osnabrück)
  Sparse Image Reconstruction for Photoacoustic Tomography Using Shearlet
- 11.00-11.30 Bart Goossens (Universiteit Gent)
  Design of Compactly Supported Tight Shearlets Frames using a Convex Optimization Algorithm
- 11.30-12.00 Kevin Degraux (Université catholique de Louvain)
  Compressive Hyperspectral Imagery
- 12.00-12.45 Céline Esser and Thomas Kleyntssens (Université de Liège)
  Detection of non concave and non increasing multifractal spectra using wavelet leaders
- LUNCH
- 14.00-14.30 Adrien Deliège (Université de Liège)
  Multifractal analysis of surface air temperature signals using the wavelet leaders method
- 14.30-15.00 Adriana González (Université catholique de Louvain)
  Blind deconvolution in astronomy using alternating proximal minimization
- 15.00-15.30 David Blinder (ETRO, Vrije Universiteit Brussel)
  Wavelet-based coding of Holographic Data
- 15.30-16.00 Colas Schretter and Shaun Bundervoet (Vrije Universiteit Brussel)
  Compressed sensing ultrasound imaging with adapted dictionaries of point spread functions

For more information:
contact Françoise Bastin (F.Bastin@ulg.ac.be) or Christine de Mol (demol@ulb.ac.be)

2.2 June 2014

FNRS group "Functional Analysis"
Thursday-Friday, June 12-13, 2014 — Esneux (Liège) , Domaine du Rond-Chêne

Following the tradition, the FNRS group "Functional Analysis" will meet next June (June 12-13, 2014). The meeting will take place in the small town of Esneux, in the "Domaine du Rond-Chêne".

The speakers are listed here below (alphabetical order)

- J. BONET (U. Pol. Valencia)
- Q. MENET (U. Mons)
- J. MULLER (U. Trier)
- A. PRZESTACKI (Poznan)
- M. QUEFFELEC (U. Lille)
- J.M. RIBERA (U. Pol. Valencia)

Specialist Workshop on
Numerical methods in the study of bifurcations
of discrete and continuous dynamical systems
June 23-24-25, 2014
Hasselt

See the announcement at the end of this Newsletter.
For more information:
contact Françoise Bastin (F.Bastin@ulg.ac.be) or Catherine Finet (catherine.finet@umons.ac.be)

3 PhD theses

From censored to cross-sectional data: non and semiparametric new developments.

Géraldine Laurent, University of Liège
Date: May 6, 2014

Thesis co-advisor and advisor: G. Haesbroeck and C. Heuchenne (ULg)

Summary

In many statistical studies, an observation is evident: the available data are regularly right-censored. A censorship arises when, for different reasons, the data time of interest can not be observed. A data is so right-censored if, instead of observing its time of interest, a lower bound of this time is considered for this data. For example, the study duration can be shorter than the time of interest leading then to a correspondence between the observed times and the study end time. Moreover, these data can be obtained from cross-sectional process. Cross-sectional process selects only data in progress at a fixed time to constitute the studied sample, determining the data followed for the study. Therefore, cross-sectional process introduces left truncation. A data is described as left-truncated if its time of interest is larger or equal to a fixed time.

It is in this context this thesis has been elaborated. The considered estimation problems for such data will be studied with a nonparametric or semiparametric approach. An approach is nonparametric or semiparametric if none assumption is supposed about the belonging to parametric family for the time of interest distribution function, solely based on qualitative hypotheses. These estimation methods have thus the advantage to be based on weaker assumptions in comparison with the parametric approaches. The aim of the different researches developed in this thesis is to improve the current estimation techniques.

This thesis is organised in four parts.

The first part (first chapter) determines the context of our researches through practical examples and a significant but not exhaustive literature overview as well as our motivation about the different researches presented in this thesis. To conclude this first part, our contributions in these researches are briefly explained.

The second part (second chapter) presents a new estimation procedure for the parameters of the parametric conditional variance in the heteroscedastic regression situation applied to right-censored data. This procedure constructs artificial data to replace censored data exploiting a heteroscedastic regression model and then defines the optimal parameters from the least squares method. The interest of this research is to fill a gap in the current literature. This second chapter refers to the article Heuchenne and Laurent (2014a).

The third part (third and fourth chapters) studies, in a regression context, the cross-sectional data, i.e. left-truncated and right-censored data, where the conditional truncation distribution function is supposed to be known. The innovation of the method proposed here consists in the use of information contained in the conditional truncation distribution function for the nonparametric estimation methods. The third chapter integrates the content of the article Heuchenne and Laurent (2014b) while the fourth chapter, which is an extended version of the proceeding Laurent and Heuchenne (2010), corresponds to Heuchenne and Laurent (2014c).

Finally, the fourth part (fifth chapter) is devoted to the cross-sectional data examination but this time for nonparametric estimation of the time of interest distribution function. In this chapter, the truncation distribution function is supposed to belong to a parametric family and not known anymore. The relevance of this approach is due to this weaker assumption than one in the above part. This information about the truncation distribution function is also introduced in the nonparametric estimation. The principles of this chapter are described in the article de Uña-Àlvarez, Heuchenne and Laurent (2014).

This thesis concludes with a set of suggestions related to possible future researches in these statistical fields.

Bibliography

− de UNA-ALVAREZ, J., HEUCHENNE, C. and LAURENT, G. (2014): Estimation from cross-sectional data under a semiparametric truncation model. (under revision in Biometrika).
− HEUCHENNE, C. and LAURENT, G. (2014a): Parametric conditional variance estimation in location-scale models with censored data. (submitted paper).
− HEUCHENNE, C. and LAURENT, G. (2014b): Nonparametric regression with cross-sectional data: an alternative to conditional product-limit estimators. (submitted paper).
− HEUCHENNE, C. and LAURENT, G. (2014c): Estimation of the error distribution in nonparametric regression with cross-sectional data. (submitted paper).
− LAURENT, G. and HEUCHENNE, C. (2010): Computational treatment of the error distribution in nonparametric regression with right-censored and selection-biased data. *Proceedings of COMPSTAT'2010*, 509-516.

4 Miscellaneous

4.1 From VUB

Vacancy for PhD student at VUB

The department ELEC of the Vrije Universiteit Brussel, Belgium, offers a funded PhD position in low-rank approximation, focused on numerical methods and applications in system identification. The position is to be filled in as soon as possible and the expected duration is 4 years.

We are looking for a candidate with strong background in numerical linear algebra, optimization, and system theory. Experience in both theoretical and applied aspects of system identification and/or time-series analysis is an advantage, but is not required. Candidates should have excellent English language skills, and they should be willing to acquire basic knowledge of the Dutch language to facilitate the integration in our international team.

The open position fits into the ERC starting grant "Structured low-rank approximation: Theory, algorithms, and applications". This project covers a wide range of applications and the PhD research topic can be adapted to the interest of the applicant. A major element of the project is the development of the SLRA package. In order to apply, contact me (Ivan Markovsky - imarkovs@vub.ac.be) by email with CV (including the names of two referees) and personal statement (motivation and background knowledge).

4.2 From UHasselt

Positions in computational maths

Two fixed positions in mathematics (computational mathematics) appear, see informations at the address

http://www.uhasselt.be/vacancies_detail?taal=04&vacid=693

4.3 Others...

Joint meeting of the Polish and German math societies

Here is a message from the President of the Polish Math Society, on behalf of the Executive Committee of Polish Mathematical Society and Organizing Committee of the DMV-PTM Joint Meeting:

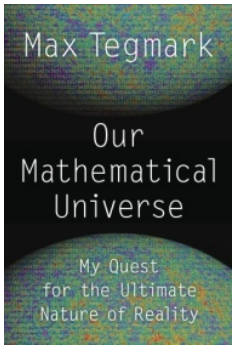
The meeting is a joint initiative of the Polish Mathematical Society (Polskie Towarzystwo Matematyczne) and the German Mathematical Society (Deutsche Mathematiker-Vereinigung). It continues the tradition of bilateral meetings which organizing societies held in last years with other national societies. Mathematicians from other countries are also cordially invited to participate. The core of the scientific program consists of plenary lectures and a series (38) of thematic sessions (mini-symposia) covering nearly all domains of mathematics.

URL: http://dmv.ptm.org.pl/

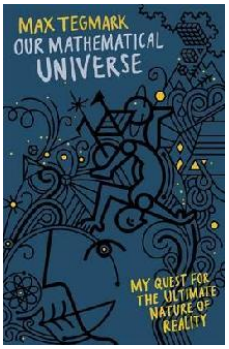
5 History, maths and art, fiction, jokes, quotations ...

As usual, please find here some reviews from A. Bultheel.

Our mathematical universe, my quest for the ultimate nature of reality. by *Max Tegmark*. Knopf/Allen Lane, 2014, ISBN 978-0307599803/978-1846144769 (hbk), 432 pp.



Knopf (USA)



Allen Lane (UK)

Max Tegmark

As mathematicians we often defend our field by telling people that they should be aware that given our technological environment, we live in a world that breaths mathematics. However, it takes a physicist like Max Tegmark to claim that we are not surrounded by mathematics, but that everything *is* mathematics, including us, the whole universe, and all the infinitely many other universes that exist on different levels, they are all just mathematical structures. After all, if you penetrate to a sub-particle level with string or brane theory, then these are basically mathematical constructs, and if this is what all stuff is made of, including us, then everything must be just mathematics. This is a shortcut. Tegmark takes a physical road to come to his conclusion.

If anybody had claimed everything to be mathematics without further ado not many people would be inclined to take this very seriously. But Max Tegmark is a theoretical physicist teaching at MIT with a strong reputation and he takes a scientific physics approach to his claims. Because he is easily approachable by the media, his ideas are also rather visible, and his message has been reverberating for a while. With this book, he brings a passionate plea supporting his beliefs. He does that by starting with conventional views on cosmology and on the quantum mechanical approach in particle physics, but where conventional knowledge stops, he goes on and attaches his own ideas. However, he plays the game openly and clearly indicates in the introduction which chapters are conventional, mainstream, controversial, or extremely controversial.

	Chapter	*Title*	*Focus*	*Status*
	1	What Is Reality?	Introduction	
Zooming Out *(What is reality on the largest scales?)*	2	Our Place in Space	How big is space?	*Mainstream*
	3	Our Place in Time	History of our Universe	
	4	Our Universe by Numbers	Precision cosmology	
	5	Our Cosmic Origins	Cosmological inflation	
	6	Welcome to the Multiverse	Level I and II parallel universes	*Controversial*
Zooming In *(What is reality on the smallest scales?)*	7	Cosmic Legos	Quantum mechanics	*Mainstream*
	8	The Level III Multiverse	Quantum parallel universes	*Controversial*
Stepping Back *(Is reality math?)*	9	Internal and External Reality	The role of consciousness	
	10	Physical and Mathematical Reality	The "reality is math" idea	*Extremely Controversial*
	11	Is Time an Illusion?	Making sense of it	
	12	The Level IV Multiverse	The ultimate multiverse	
	13	Life, Our Universe and Everything	Future of Universe and humanity	*Controversial*

The book has three parts: The first part on cosmology (zooming out), the second on quantum mechanics (zooming in) and a third part (stepping back) that is more philosophical in which he explores the answers he found in *his quest for the ultimate nature of reality*. Somehow his quest is like the quest for *meaning of life* as in the comic sci-fi books of *The Hitchhiker's Guide to the Galaxy* by Douglas Adams, (in fact the *Hitchhiker's Guide* is quoted a lot) only Tegmark takes his quest more seriously. He calls his own ideas 'mind blowing' or 'crazy' and more of that kind of adjectives and he uses expressions like 'Hold on!!! Did I just go bananas???', but then he starts arguing that they are not that crazy after all. He stretches the subject to the limit in all

possible directions. Not only in space and time dimension, but also from hard mathematics, over experimental physics to philosophical world views. Although his conclusion is that everything is mathematics, there is not really mathematics present. All you need to know is that mathematical structures are "sets of entities with relations between them". The text is thus very readable and accessible for everybody. His exposition is very entertaining and fun to read. Often a number of questions are explicitly formulated (the ones that the reader already formulated in his mind) which are then answered one by one. All this is sprinkled with a sauce of autobiographical interludes. For example, he was born in Sweden. His father Harold Shapiro is a mathematics professor at KTH in Stockholm, but because Max thought Shapiro was a name too common to distinguish him from other Shapiro's in his scientific career, he decided to use his mother's name Tegmark that was much less widespread. During his career he developed a 'Dr. Jekyll/Mr. Hyde strategy' working as a 'serious scientist' but never giving up his passion for 'crazy ideas' on the side. This book is written by both Dr. Jekyll and Mr. Hyde.

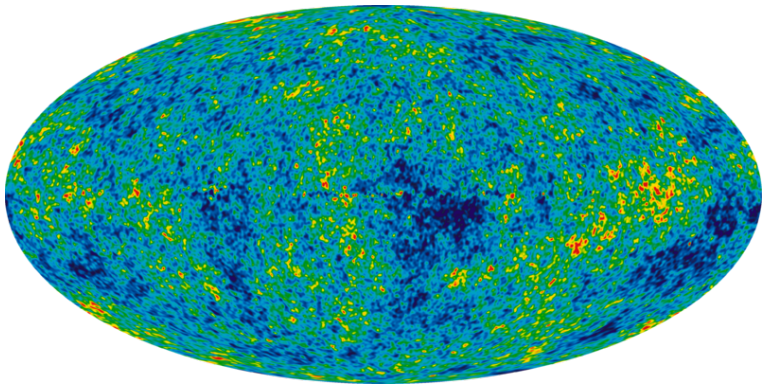

Harold Shapiro


Hugh Everett

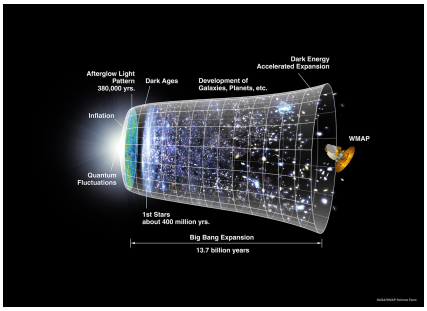

Mark Everett (E)


Schrödinger cat

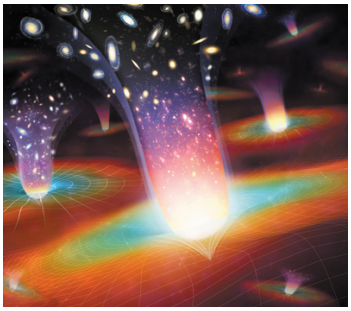
Let me briefly sketch his approach and arguments. He starts with the human race exploring space. First by computing the size of the moon, the sun, the stars, the galaxies, etc. The further we can see in space, the further we see in time because it takes time for the light to travel. If we see fewer and fewer galaxies further away from us, then it is because that many light years ago, the galaxies were just starting to coagulate by gravity from the particles in the cosmic gas cloud. We see only 'baby galaxies'. Still further there is nothing to be seen, only darkness, but there is still energy coming from that far away. This is the afterglow of the very hot universe in its baby-years. It forms an opaque 'plasma wall' behind which nothing is visible anymore and it can be visualized by the cosmic microwave background (CMB) radiation. Tegmark and his first wife were strongly involved in visualizing this plasma ball using data from the WMAP project (later confirmed and improved by the Planck project). Fluctuations in the CMB spectrum gives evidence of the mysterious 'dark matter'. So, reordering these observations forward in time, the reader is introduced to inflation theory where some 13.7 billion year ago the universe inflated very fast, hydrogen was partly transformed into helium. The hot plasma prevents looking beyond the 400,000 year young universe. Then gravity started forming galaxies while the expansion was slowed down. The 'Big Bang' is not the starting point, but was caused by the inflation. However, since the universe is still expanding at an increasing speed, the existence of dark energy is needed. Dark matter and dark energy form 95% of the material in the universe. Tegmark ends this cosmic part by introducing his so-called Level I and II multiverse. Define our universe as the region from which light has


WMAP: the bright plasma wall (our baby universe)

reached us during the 14 billion years since our Big Bang, i.e., everything we can observe. Then, assuming space is infinite, it is quite reasonable that there is an infinity of parallel universes out there, beyond reach. This is the Level I multiverse. All these universes still obey the physical laws that we know, and these laws are very restrictive. Three space dimensions and 1 time dimension is the only possibility, and there are many physics constants that have to be tuned very precisely to make a universe as we know it possible. But the theory allows different solutions, so there must be universes with different effective laws of physics. A Level II multiverse exists because a Big Bang is a local phenomenon, ours happened only for that part of space that we inhabit but many other Big Bangs do take place, creating parallel universes with different physical laws like bubbles in an ever inflating space.



inflation theory



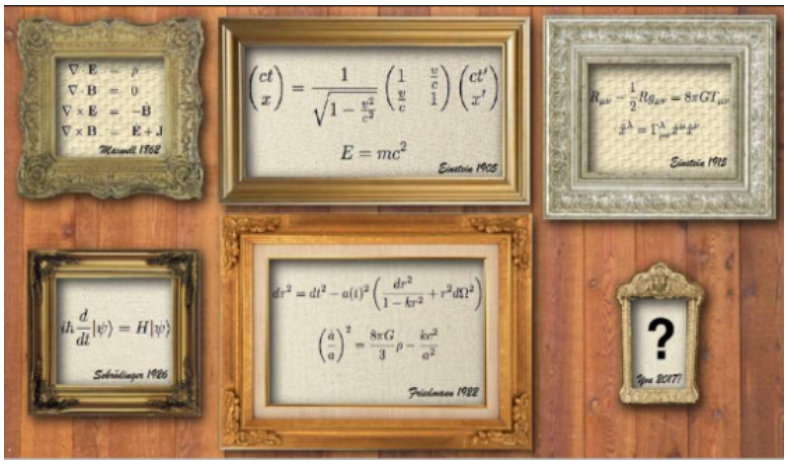
several Big Bangs

alternative Schrödinger cat

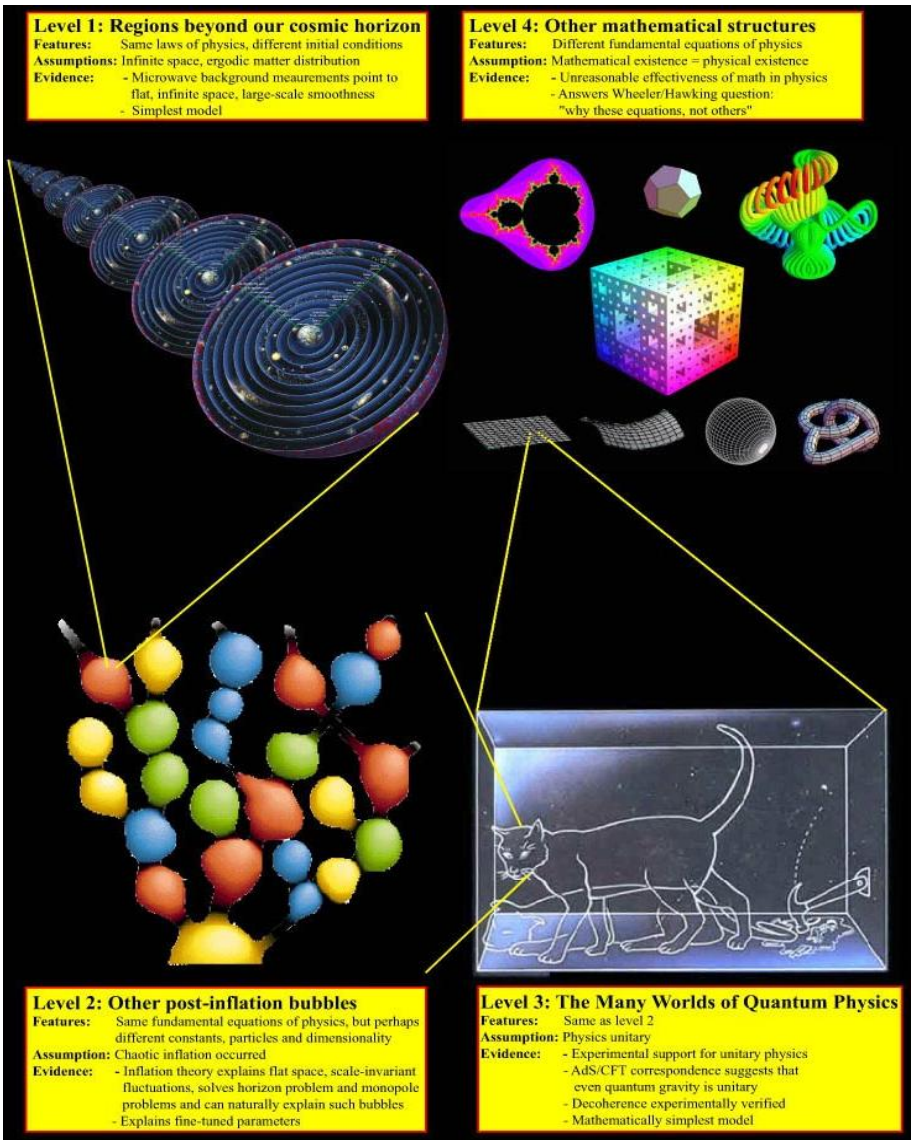
Let us now move to part 2 on quantum physics. Here he gives the many world interpretation of Hugh Everett as an alternative for the Copenhagen interpretation explaining the collapse of the wave function when we observe a system in quantum superposition state. Everett argued that both outcomes of the observation are possible, but that both are observed so to speak in two different worlds. This creates Level III parallel universes, not very far away beyond reach of observation, but separated from us in a Hilbert space where Schrödinger's wave functions live. Tegmark appears in a BBC documentary with Hugh Everett's son Mark who tries to understand his father's work. Mark Everett, also known as E is the front man of the rock band Eels. However, since everything is possible as outcome of an observation, Level I and II universes can be found as Level III parallel worlds.

The second half of the book goes to part 3. While the original ideas for all multiverses of previous types were initiated by others, the ultimate Level IV mathematical universe hypothesis (MUH) is Tegmark's own construction. There is the external reality, of which we only can observe a small part by what our senses allow and moreover it will we interpreted by our minds, and that can differ for individuals. If we agree upon an external physical reality (which corresponds to the intensively investigated Theory of Everything (ToE)), then it must be a mathematical structure, devoid of all baggage of possible interpretations and wordings that we humans use.

Then he deals with self-awareness, prediction, randomness (in a mathematical structure there is no randomness, but you may take averages over the infinitely many universes), and this requires the notion of a measure. Since this measure causes problems (the end of humanity, breakdown of inflation theory, instability of the universe,...), he blames this failure on infinity (the infinitely big = infinite space and the infinitely small



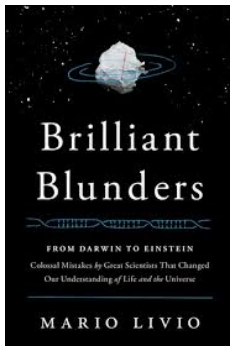
= continuity). One could do away with continuity as an approximation of reality. In the end, everything reduces to particles and the result only resembles to be continuous at a much larger scale. Reality is discrete. In any mathematical structure that contains a substructure that is self-aware will experience its world as physically real as we do. So the Level IV multiverse will contain all other multiverses. Moreover, not only universes with different effective physical laws being different solutions of the same fundamental laws may exist, but also the fundamental laws can differ. However, the structures should lead to decidable and computable conclusions, so Gödel's incompleteness and the Church-Turing uncomputability should not lead to inconsistencies. This rules out all structures containing infinity e.g., the real numbers. A strange conclusion in view of all the preceding statements.



Tegmark's multiverses of Levels I-IV

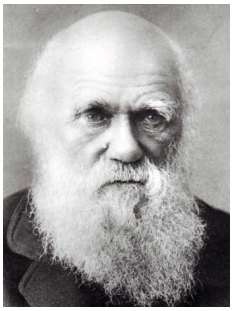
If you were not pondering some of the (many) questions that Tegmark is formulating in this book, he will start you thinking about some. There are reasonable scientific answers to some of them, but other answers given by the Mr. Hyde alter ego are hard to believe and many will have problems in following his 'scientific' arguments. What starts as a very nice and elucidating explication of our cosmos, ends in speculative mystic science fiction. It might be tempting for a mathematician to believe that everything is just a mathematical structure, I doubt that many mathematicians will convert to Tegmark's faith by lack of the convincing logical steps. Tegmark has been preaching these ideas for a longer time and you may find several criticisms on the Web. Reading this book will prepare you to engage in the discussion. A. Bultheel

Brilliant Blunders: From Darwin to Einstein. Colossal mistakes by great scientists that changed our understanding of Life and the universe by *Mario Livio*. Simon & Schuster, 2013, ISBN 978-0-14-3919-236-8 (hbk), 352 pp.

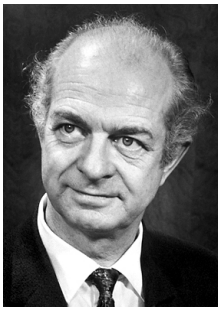


Mario Livio

Great scientists who developed brilliant revolutionary theories have gained an almost super-human status. However as Mario Livio so meticulously describes in this book, such theories are not born perfect and polished and even the greatest scientists erred brilliantly. His story is braided around five scientists and their blunders, but it also gives a detailed historical description of how science evolved. Indeed, human knowledge is a dynamical, ever changing system that builds on existing structures, but that needs a mutation or crossover from time to time. The Big Five of this book are the ones that colored outside the box. Livio selected Charles Darwin, Linus Pauling, Lord Kelvin, Albert Einstein and Fred Hoyle. One would expect they cover quite different fields, but Livio molds them into a continuous account.

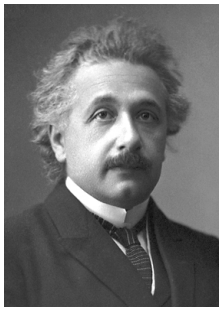


Darwin



Pauling

Kelvin



Einstein

Hoyle

Darwin's blunder was blending inheritance: children have the blended genes of their parents, which undermined his own theory of evolution. Of course he was not aware of the genetics research and the structure of DNA that Pauling was trying to discovered. That came much later. However Pauling wrongly proposed a triple helix structure for DNA and he was beaten by Francis Crick and James Watson who finally got it right. Darwin's theory would need the Earth to have existed for a very long time and Kelvin wanted to rebut this on an energetic basis. After doing the math he found that the Earth must be some 100 million years old while it is actually 4.567 billion years. Kelvin missed the fact that the Earth is not a solid rock with heat transfer by conduction but that there was also heat transfer by convection as volcanic eruptions testify. Looking beyond the Earth at the dynamics of the universe, Hoyle proposed the steady-state universe. George Lemaître countered this with his Big-Bang theory, which was confirmed by the observation of the background radiation. It is often stated that Einstein considered adding an artificial cosmological constant to his equations to be his biggest blunder. However Livio carefully examines the evidence and concludes that Einstein never said that but that George Gamov is the originator of that rumour. However Einstein afterwards removed dark matter from his theory and that turned out to be a blunder because fifty years after his death it was found that actually 75% of the total mass of the universe is dark energy.

Livio succeeds in taking the lay reader along in this fascinating evolution of science in the 19th and 20th century. We get some insight in how new theories develop, and we learn something about the psychology of the scientists paving the road. How they competed with each other, sometimes gracefully admitting that they made an error, sometimes stubbornly clinging to their own theory against all evidence.

There is no mathematics in this book. First of all because Livio wants to bring the story to a broad audience, and secondly, although some of the theories were based on thorough calculations and these are not essential to the message he wants to bring. So why to bring this review to the attention of the readers of this Newsletter who are assumed to be mathematicians? First, it is interesting to learn the dynamics of scientific knowledge, and mathematics is an essential part of science as such. But math is

also an important instrument in other scientific disciplines and becoming even more so every day.

My main reason is however a nice whodunit story that Livio inserts concerning George Lemaître. Lemaître, was a Belgian priest with a doctoral degree in math from the Leuven University in 1920 as a student of de la Valée Poussin[1] for his research on multivariate functions. Arthur Eddington from Cambridge introduced him to cosmology, whereupon he moved to Harvard to work with Harlow Shapley and got another PhD at MIT in 1927. In that year he published in the *Annales de la Société Scientifique de Bruxelles* a paper entitled '*Un Univers homogène de masse constante et de rayon croissant rendant compte de la vitesse radiale des nébuleuses extragalactiques*'. It contains the idea of an expanding universe and he derives what we now call Hubble's law. Lemaître's theory was based on observations of the red-shift of Vesto Slipher in 1922, and listed by Eddington. Hubble's law says that the velocity of recession is proportional to the distance. The paper even gives a value for the rate at which this happened. The so-called Hubble constant. It turned out later to be wrong by an order of magnitude, but still. So if Lemaître was the first to publish these results, then why is Hubble's name attached to it? It so happened that an (abridged) English translation of the 1927 paper was published in 1931 in the *Monthly Notices of the Royal Astronomical Society* in England. However several paragraphs were removed in the translation and in particular, the ones describing Hubble's law. So it was speculated in 2011 by some historians that someone had deliberately made this 'selective translation' to allow Hubble to claim the priority, who had basically done the same calculations, only using slightly more accurate data and meanwhile also published his results. So Livio has dug up the relevant evidence to find out who was responsible. A first piece of evidence is a handwritten letter from William Marshall Smart, editor of the *Monthly Notices* to Lemaître, asking him permission to translate and reprint his paper.

George Lemaitre

Edwin Hubble

Dear Dr. Lemaitre

At the R.A.S meeting last Friday, it was resolved to ask you if you would allow your paper "Un univers homogène..." in the Annals of the Soc. Sci. de Bruxelles to be reprinted in the Monthly Notices. It has been felt that it was not circulated as widely – or isn't as well known – as its importance warrants – especially in English speaking countries. This request of the council is almost unique in the Society's annals and it shows you how much the Society appreciates the honour of giving your paper a greater publicity amongst English speaking scientists.

Briefly – if the Soc. Scientifique de Bruxelles is also willing to give its permission – we should prefer the paper translated into English. Also, if you have any further additions etc on the subject, we would gladly print these too. I suppose that if these additions a note would be inserted to the effect that -en are substantially from the Brussels paper the remainder is new (or something more elegant). Personally and also on behalf of the Society I hope that you will be able to do this.

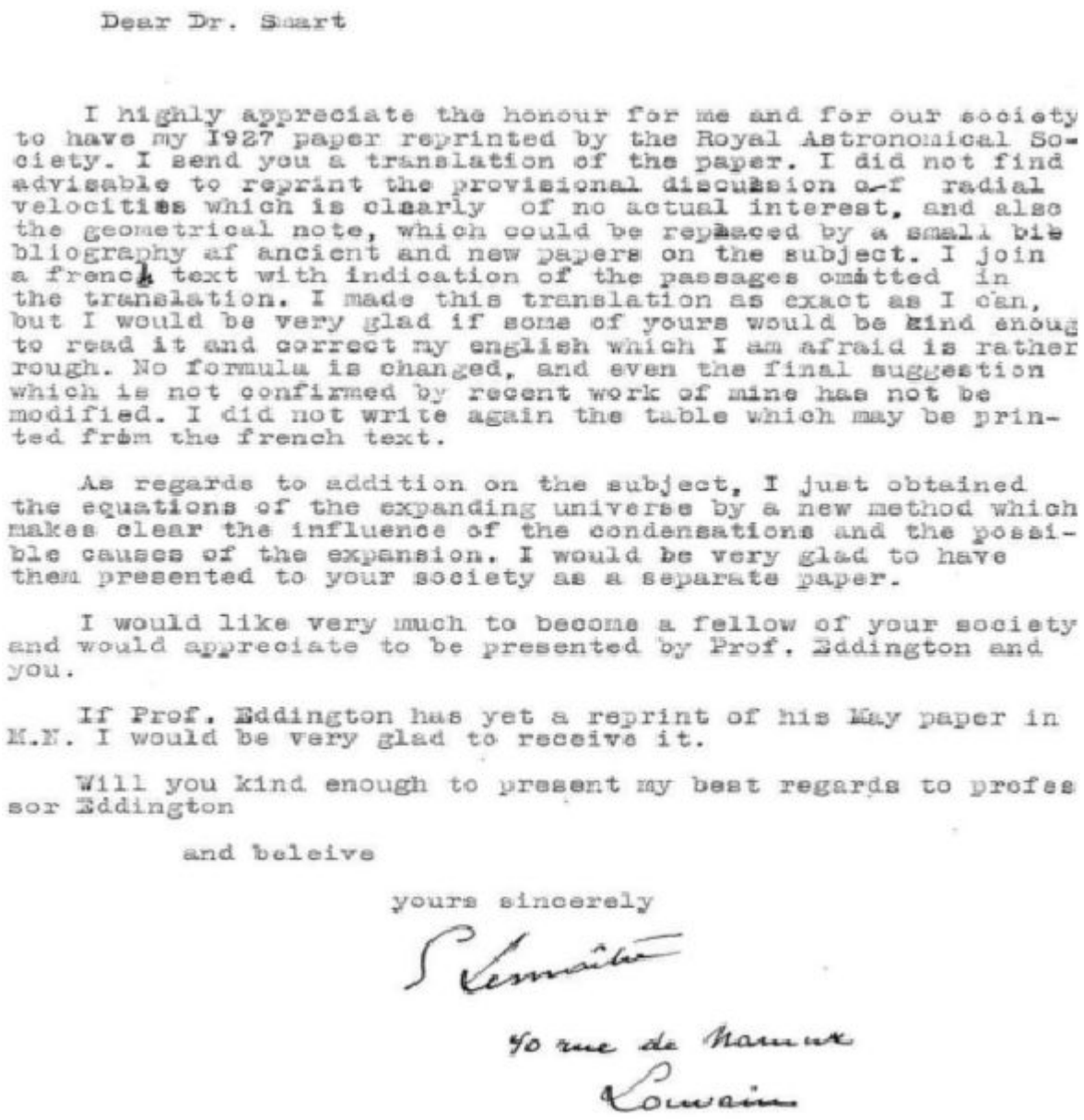
By the way, you are not a fellow of the Society; if you would like to become a fellow, would you let me know and Eddington will sign your nomination paper. In case you are ignorant of the fees etc. the annual subscription is £2-2-0 with an entrance fee of the same amount.

With kind Regards,
Sincerely yours

That letter seemed innocent. So who did the translation? Livio went to the minutes of the RAS meeting and found out that Dr. Jackson was the one who made the proposal to republish Lemaître's paper. But

[1]President of the BMS 1927-1929.

here he also found Lemaître's answer dated March 9, 1931, and that resolved the mystery.



Dear Dr. Smart

I highly appreciate the honour for me and for our society to have my 1927 paper reprinted by the Royal Astronomical Society. I send you a translation of the paper. I did not find advisable to reprint the provisional discussion of radial velocities which is clearly of no actual interest, and also the geometrical note, which could be replaced by a small bibliography of ancient and new papers on the subject. I join a french text with indication of the passages omitted in the translation. I made this translation as exact as I can, but I would be very glad if some of yours would be kind enough to read it and correct my english which I am afraid is rather rough. No formula is changed, and even the final suggestion which is not confirmed by recent work of mine has not be modified. I did not write again the table which may be printed from the french text.

As regards to addition on the subject, I just obtained the equations of the expanding universe by a new method which makes clear the influence of the condensations and the possible causes of the expansion. I would be very glad to have them presented to your society as a separate paper.

I would like very much to become a fellow of your society and would appreciate to be presented by Prof. Eddington and you.

If Prof. Eddington has yet a reprint of his May paper in M.N. I would be very glad to receive it.

Will you kind enough to present my best regards to professor Eddington

and beleive

yours sincerely

G. Lemaître

40 rue de Namur

Louvain

So this put to rest all speculations. Lemaître himself did the translation and omitted the paragraphs. Clearly he was not obsessed by a priority claim. He considered Hubble's observations more accurate and he saw no reason to repeat Hubble's results in his translation.[2] He instead wrote a new paper that was also published in the *Monthly Notices*. By the way Lemaître did accept the invitation to become a fellow of the RAS and was officially elected in 1939. When invited in 1931 to London for the conference *The Evolution of the Universe* Lemaître proposed his theory of the *Primeval Atom* for the first time[3]. Not many believed it and called it mockingly the *Big Bang* theory, a name that was so catchy that it actually contributed a lot to its popularity. At this conference cosmology and nuclear physics were connected for the first time. Lemaître was elected member of the *Royal Academy of Sciences and Arts of Belgium* in 1941. Although he did not publish it, he had a version of the Fast Fourier transform in the 1950s before Cooley and Tuckey and he introduced and programmed the first computer at the university in 1958 (a Burroughs E101). He was also the president of the Belgian Mathematical Society in the years 1947-1949.

A. Bultheel

[2]This story is found in the book but Livio published his findings first in 2011. Lost in translation: Mystery of the missing text solved, *Nature* **479**, 171-173, (2011).

[3]Later published as a letter to the editor: G. Lemaître, The Beginning of the World from the Point of View of Quantum Theory, *Nature* **127** (1931), p. 706.

This Summer ESA will launch the fifth Automated Transfer Vehicle (ATV) from French Guiana with an Ariane 5 flight. Most of it consists of an Integrated Cargo Carrier (ICC) that will join the International Space Station (ISS) and provide new supplies. The ATV is named after George Lemaître, the Belgian priest who developed the Big Bang theory.

Here worked
Georges Lamaître ⟶
father of the
Big Bang

Lemaître worked most of his life in the Premonstreit College in the Naamsestraat in Leuven, that housed astrophysics research of the, in those days still, united Catholic University of Louvain. On May 7, 2014, a colloquium in Leuven was organized jointly by UCL and KU Leuven about recent evolutions in cosmology and part was devoted to George Lemaître as a scientist and as a person. On that occasion also a commemorative plaque was inaugurated at the Premonstreit College with several members of the family Lemaître present. It's but a small plaque for a big bang.

Lemaître @ Premonstreit
with Odon Godart en Andrée Bartholomé

©Archives Georges Lemaître

Inauguration of the plaque
7 May 2014

Photo Vertommen

George Lemaître is one of the greatest Belgian scientists. He was born in Charleroi, 120 years ago on 17 July 1894 and died on June 20, 1966 and was burried in Marcinelle. He got the Francqui Prize in 1934, the highest scientific distinction in Belgium. He was also president of the Belgian Mathematical Society in the period 1947-1949.

The Doctoral School of Sciences of UHasselt, The Doctoral School of Natural Sciences of UGent, and the KULeuven Arenberg Doctoral School organize a

Specialist Workshop on

Numerical methods in the study of bifurcations of discrete and continuous dynamical systems

June 23-24-25, 2014

www.uhasselt.be/dysy-workshop2014

Organizers
Peter De Maesschalck (UHasselt)
Willy Govaerts (Ugent)
Dirk Roose (KULeuven)
Giovanni Samaey (KULeuven)

Main Lecturers
Yuri Kuznetsov (Utrecht University)
Hil Meijer (Twente University)
Jan Sieber (University of Exeter)
Gaetan Kerschen (Université de Liège)

Contents
In this 3-day workshop the students will learn to numerically study the bifurcation behaviour of discrete and continuous dynamical systems, which includes tracing bifurcation diagrams for bifurcations such as saddle-node bifurcations, period doubling bifurcations, Hopf bifurcations, pitchfork bifurcations, Bogdanov-Takens bifurcations, … The workshop will focus on discrete dynamical systems, ordinary differential equations, delay differential equations. The workshop comprises both theoretical sessions and practical sessions. In the practical sessions, computer software MATCONT and DDE-BIFTOOL (both MATLAB based) will be demonstrated.

Audience
The workshop is directed to PhD students inscribed in one of the doctoral schools, but also to all other PhD students and postdocs interested to learn about the subject. The workshop is ideally suited for PhD students working with applied dynamical systems in areas as mathematical analysis and mathematical applications of dynamical systems in physics, engineering, biology and chemistry. Participants should have a basic understanding of applied dynamical systems. A basic knowledge of MATLAB is not required, though useful.

Registration
There is *no registration fee*, though registration is obliged **before June 1, 2014**. Registration is done by sending an email to stefanie.kerkhofs@uhasselt.be, mentioning "BIFURCATIONS 2014" in the email subject line. The number of participants is not unlimited.

Venue
The workshop will take place at Hasselt University, Campus Hasselt, Building "Oude Gevangenis", on walking distance from Hasselt railway station. Address: Martelarenlaan 42, 3500 Hasselt.

Program
Please consult the website.

Contact information

- Practical information: stefanie.kerkhofs@uhasselt.be
- Workshop information: peter.demaesschalck@uhasselt.be, willy.govaerts@ugent.be, dirk.roose@cs.kuleuven.be, giovanni.samaey@cs.kuleuven.be.

Vlaanderen In Actie Pact 2020
Met steun van de Vlaamse overheid