Retreat Nov 24-30, 2013, Tokerau Beach

Santiago Figueira (UBA),
Alexander Gavruskin (AUT, Auckland),
Alex Galicki (PhD student, Auckland University)
Takayuki Kihara (JAIST),
Kenshi Miyabe (Tokyo Daigaku),
Andre Nies (Organizer, Auckland University)

Nov 25

10:00 Problems the participants would like to solve

11:30 Normal reals (Santiago)

Nov 26

10:00 The notions of meager-additivity and null-additivity in the theory of algorithmic or higher randomness (Takayuki)

I have shown that the Schnorr-type effectivizations of the the notions called meager-additivity and null-additivity characterize (which are related to cardinal characteristics) are uniform lowness for Kurtz randomness and Schnorr randomness, respectively. I will discuss the notion of Martin-Loef null-additivity. I do not know whether ML null-additivity characterizes lowness for ML randomness. I would also like to discuss higher version of meager and null-additivity.

8:00pm Workshop on research collaboration

Nov 27

10:00 Resource-bounded randomness notions (Kenshi)

Currently we only have poly-time randomness, but we need more.
We can consider P, #P, PSPACE versions of ML,
computable, Schnorr, and Kurtz randomness.

Further topics to discuss:
K-reducibility implies vL-reducibility, how about Schnorr version?
Relation with set theory (Takayuki)

11:30 Algorithmically random structures (Alexander Gavriushkin)

Following Khoussainov [1], we introduce the notion of a
Martin-Loef random structure using a special measure on the class of countable structures. We also discuss some properties of this randomness notion as well as similarities and differences between the measure space we introduce and the Cantor space.

[1] A quest for algorithmically random infinite structures, manuscript, 2013.

8:00pm Workshop on giving talks

Nov 28

10:00 Differentiability of computable functions in higher dimensions, density, and porosity (Andre and Alex Galicki)

How the slightly exotic concept of porosity simplifies a LOT of things.

8:00pm Workshop on writing proofs, and writing papers

Nov 29

10:00 Progress report on problems the participants wanted to solve

8:00pm Open workshop

Nov 30

9:00 Breakfast and Discussion

11:00 Cleanup 12:00 Departure

WORKSHOPS

1. Research collaborations

Santi: Have with Carlos Areces on modal logics from perspective of CS (ca 4 papers; 5 yrs). Want with Elvira Mayordomo, Laurent Bienvenu.

Kenshi: Have Jason Rute (2 papers, 2 yrs). Want with Jeremy Avigad

Takayuki: Kojjro Higuchi (4 papers), Gregoriades (1 paper) Want with Sy Friedman

Alex Gavruskin: Frank Stephan, Sanjay Jain (4, 2yrs) , want with Uri Andrews, Steffen Lempp (Madison), Julia Knight (Notre Dame).

Alex Galicki: Want Jason Rute, Dan Turetsky

What is a research collaboration?

2-5 people, close mutual interest, common goals, knowing each other's interest, papers together, visits, email+ Skype consultation, joint grants

People without much research collaboration: Y. Ershov, Harvey Friedman, Dana Scott

People with lots: Terry Tao, Lempp, Shore, Joseph Miller, Andre, Erdos, Laurent Bienvenu

Why important? 1. research-- Faster, more fun, complementary expertise, co-author checking makes paper better

2. real-life: get grants, jobs (both are in descriptions), promotions -- publication can take longer though :)
Important to get someone more senior (indirectly more collaborations, reputations, letters)

How to build research collabs

grow expertise in various areas

Initial: talk to people at conferences, send emails, do visits in both directions

Prepare for visits: have list of topics, open questions (relating to the hosts), some ideas how to do them (?)
read host's papers

how long should one visit? complicated equation

During visit: start writing with other person's contribution (dropbox?)

After: keep in touch, write paper, finish in reasonable amount of time, or follow ups,

Fancy tech tools: virtual whiteboard, Gmail tex will tex formulas , needs plugin for firefox/ chrome

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2. Giving talks

Why is it necessary?

For research: Spread results: good to get feedback, find new collaborators

For real life: may be mandatory anyway (CS conferences), to improve CV

How to get invited?

(besides doing good research)

give good talks, be visible, especially good website, put some slides there etc
tell people about your research

don't decline if at all possible, don't change plans.

CS type Conferences are useful: fast process, good referee reports, good on CV

Conferences to submit to (ordered by common rankings):

CCA, CCR < CiE, CSL, Wollic < STACS < LICS, ICALP < FOCS, STOC

Recent STACS papers in ``our'' area: 2 on Solovay functions, one on Demuth alternative, Denjoy etc

LICS: lots by Bakh Khoussainov, some by Andre (automatic structures, Borel structures)

Slides or Board?

At conferences probably slides. For seminar talks with lots of time, also board

board: write readably! Put all hypotheses, make ``complete written sketch''. State definition orally before writing

slides: *making*: don't put too much, put pictures, appealing, overlay (but not for the website)

using: don't read them off, rather face audience, don't go too fast. Leave time for last lines!

Beamer: for posting on website use \documentclass[handout]{beamer}
\setbeamertemplate{navigationsymbols}{}

 \setbeamercolor{math text}{fg= black!40!blue} ??

Audience:

think who they are, know their level of expertise , interests, background

Speaking

avoid words such as

VIRUS `like'', basically, really, actually,

FILLER ``so, eehmm''

No half sentences

Instead: use SILENCE

Example: Sasha Gavruskin gives talk at special session of ASL meeting

Title: r.e. structures

What's the first thing to say?

Don't: thank the organisers , ask whether they can hear you,

rather: start with something interesting, provocative, funny, personal

later on:
overview

keep them aware of structure

summary (?)

open questions

references

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minimise definitions/concepts. Short theorems. Not many equal looking things,
but only the most important. Don't copy from paper, at least not verbatim

3. Writing workshop

Exercise

Write a paragraph of nonfiction consisting of 3-4 shortish sentences. Make it as interesting as possible. Not on your maths specialty.

Alex

The biggest mistake of human beings is to call peanuts ``nuts''. Peanuts are not nuts, and never were nuts. They are beans that pretend to be nuts. In what follows, we provide a rigorous and self-contained proof of the above.

Alex

In 2012 the German tax police, in one of their routine checks on public transport, found an old man with 9000 Euros in cash. Since the person was unemployed and not on welfare, the situation was deemed to be suspicious enough to warrant a search of his flat. What the police discovered in his small apartment stunned everyone: one of the largest collections of paintings in the world. The estimated worth of the collection is more than a Billion dollars.

Kenshi Japanese sentences are made of mainly two kinds of characters: Kanji and Hiragana. Hiragana represents their sounds as usual western languages; Kanji, which was introduced from China around 1500 years ago, represents their meanings. It is said that the popularity of mangas in Japan is due to its mixture of picture and sentences, which is similar to the mixture of Kanji and Hiragana. `
For this reason, once you get familiar with this mixture of two different kinds of characters in Japanese, you can read many books very rapidly (I do not recommend such a way of reading for math books!).

Santiago Here is the recipe of the typical (and extremely simple) Argentinean salad, which seems to like you all: boil cubes of potatoes and eggs for 20 minutes. Cut the eggs and mix them with the potatoes, together with abundant olive oil. Finally, add salt, pepper and herbs. It can be served either hot or cold.

Andre

The now defunct Kepler telescope, launched in 1997, has been used to discover over 100 exoplanets. The first ones discovered were gaseous giants similar to Jupiter, but surprisingly orbited their suns at so close a distance that their surface temperatures often exceeded 800C. Only recently, rocky planets of size comparable to Earth's have been found. Water can exist there in liquid form, so that they could possibly harbour life.

How to make things interesting? (besides choosing topic)

surprise element, know interest of reader
facts, numbers,

use rare words: The ICM is a *quadrennial* conference that…

How to write proofs (1- n pages)

Give proof idea?

Yes. Faster reading/ explains structure/ experts will get the rest of the proof mostly from the idea (+ some checking of formal)/ easier to check for referee

negative points: possible repetition/ increases length
proof idea will need some definitions/ notation (put there, or in introduction)

formal part: elucidate with examples, or pictures

Andre: don't tex right away (?) (or buy Bakoma Tex)