Mathematical (online) meetings reimagined?

Ross J. Kang

In our daily professional lives, we have become accustomed to – or wearied by – changes brought on by restrictions that started in the spring of 2020. Many of our mathematical research meetings have been transferred directly online, with varying degrees of success. Could we imagine other, better ways of doing things? In this note, I discuss an experimental initiative launched to investigate this question, and call on others to embrace the challenge.

> *The enemy of art is the absence of limitations.*
>
> Orson Welles

A preface

It is clear that issues like the ones raised here are on the minds of many. Indeed, in an earlier edition of the "Young mathematicians' column" of this periodical, we saw two related pieces from the perspective of early-career researchers. This letter gives the viewpoint of mid-career researchers, ones with plenty of familiarity with the organisation of pre-COVID Mathematical events. It describes early experiences in the conception and setup of an "online research guild" devoted to bespoke, scientifically high-level, interactive workshops, specifically designed for these times, and perhaps beyond. Though it might require a bit of courage, the model could be of interest to other mathematical communities.

Introduction to the issues

It's been over a year now. With all the tragedy and turbulence we've witnessed or endured, we're keen for vaccines to bring us back to some semblance of our previous "normality". For many of us, our professional lives have continued to roll along – we read, think, write, talk, teach, advise, collaborate – albeit subject to the rigours of social distancing.

In mid-2020, it was astonishing how rapidly subject-area seminars bloomed into a dynamic panorama of ideas instantly accessible from anywhere, in digital perpetuity. One might wonder if this marks a lasting change in how we learn about, discuss, and explore new research. (Surely yes!)

One might then also wonder if we could make better use of the communication technologies at our fingertips. Is it enough to do nearly exactly what we used to do, except virtually?

Over a few emails, a colleague of mine, Jean-Sébastien Sereni, and I considered these questions and, like many, noticed some shortcomings of the direct transition of meetings online. One, the natural intimacy and informality in talks has become more limited. Two, the exchange of information is now quite one-directional, especially when talks are intended for online video clips. Three, making new acquaintances and connections is more awkward in large groups. Four, and most importantly, these changes have affected younger, more isolated, or less established researchers more. After all, how brave must such a researcher be to raise their voice in a crowded, recorded, virtual seminar room shared with the world's foremost experts in a given topic?

Through our correspondence, the essential question we eventually arrived at was this: setting aside for a moment existing seminar/workshop/conference series, what is the best way to set up online mathematical meetings?

(Perhaps pause to meditate on this, before reading on about how we analysed the question.)

An analysis and a possible approach

Let's break the problem down. What are the main scheduling constraints? Rather than coordination of travel arrangements, it is the participants' ongoing care/service/teaching obligations and the intersection of their timezones. Scope and scale? Rather than large meetings covering many topics, it's very sensible to focus on one specialised topic at a time in smaller gatherings. Which format encourages intimacy and multilateral interaction? Instead of only showcasing talks with the latest technical results, we can give extra weight to expert surveys or tutorials, and set aside time for reflection, discussion and problem-solving in small groups. How to spark new connections? As it is more difficult to have meaningful chance encounters online (as we used to have at coffee/drinks, over meals, on walks), we can make use not only of common research interests but also of our existing networks to stimulate new links.

Based on these thoughts, we decided to try the following setup. We gathered a broad group of European researchers in our field (graph theory, currently an online research guild of a few dozen members, cheekily dubbed 'A Sparse (Graphs) Coalition'), with the shared aim of curating and organising a diverse series of small-scale, high quality, interactive, online workshops. The goals are to
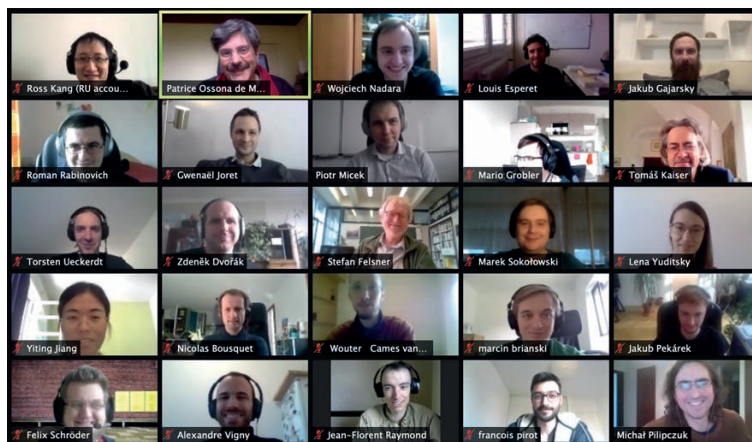
An obligatory group photo from the first workshop

learn, prove and conjecture. The workshops have focused on open problem-solving in loosely-organised breakout groups, with tutorials, surveys and update/social meetings lightly interspersed. The meetings have deliberately been planned with current workflows in mind, with sparing but strategic use of virtual contact time, to let participants think about the mathematics independently according to their personal schedules and ongoing obligations.

(The wiki at https://sparse-graphs.mimuw.edu.pl/doku.php has more detail on the formats we tried out. By no means do we claim to have found an optimal construction! If others have begun similar initiatives, we'd be happy to get in contact to share best practices.)

To our delight and surprise, however, this method turned out to be very effective. In both pilot sessions, which took place in late-February (on generalised colouring numbers, organised by Piotr Micek and Michał Pilipczuk) and early-March (on the entropy compression method, organised by Jean-Sébastien and myself), there was high interest, engagement and satisfaction. Participation, especially by younger researchers, was eager and committed: they not only enjoyed their experiences greatly, but also learned and achieved a great deal, while forming close new contacts. Several of the working groups have begun preparing manuscripts for publication – already two have been posted: arXiv:2103.17094, arXiv:2104.09360. With all of the online tools available these days, organisation was exceptionally light and pure, and without the usual worries about finances, travel, bookings, and administration.

It went so well that we found ourselves asking why we hadn't done this years ago.

(One can even imagine, a little outside of the traditional structures, whether more creative ideas for increasing the potential of modern internet conveniences in science generally are long overdue – think of journals, societies, and training, for instance.)

Future work

Now this brings me to the main point.

Of course it is natural to take the stance that this is all temporary and we can soon return to our earlier, pleasant, and high-flying ways of discussing mathematics with our distant colleagues. But while this predicament lasts, why not creatively experiment with and get used to something versatile and more sustainable?

There is clearly much to gain, even for when restrictions are relaxed. If remote practices prove sufficiently effective and advantageous in the long run to complement and partially replace our earlier methods, consider the savings in research funding and carbon footprints, or the accessibility regardless of participants' grant status or childcare responsibilities, or the ease and flexibility of organisation, or the rapid responsiveness to developments in the field. With some extra thought on their design, could online workshops be a fast, cost-effective, convenient, accessible, sustainable, engaging, and powerful mode of mathematical cooperation?

I leave this as an open problem.

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