

## Report of the informal discussion about gender equality in mathematics at MFO Workshop 1710

The MFO Workshop 1710 included a special evening event entitled “*Real nonnegative representations for women in mathematics*”, in celebration of International Women's Day on the 8<sup>th</sup> of March 2017. The event consisted of a fishbowl discussion about the state of women in mathematics in different countries, with a special focus on the concrete actions which are or might be taken towards gender equality in mathematics in academia.

Following the scheme of the fishbowl discussion, we asked six participants in the workshop to sit around a table in the middle of the MFO dining room and we also placed an empty chair at this same table. The rest of the participants and the organizers were sitting at the other tables around this “fishbowl” and were invited to join in the discussion, at any time, occupying the empty chair. The rule was that any new entrant in the fishbowl can sit on the “hot spot” until another member of the audience wants to enter the discussion. The fixed members of our fishbowl were: Raul Curto (USA), Monique Laurent (Netherlands), Marie-Françoise Roy (France), Markus Schweighofer (Germany) and Thorsten Theobald (Germany). The discussion moderator was Cordian Riener (Germany, Oberwolfach Leibniz fellow 2017) and the participants alternating each other on the hot spot were: Christian Berg (Denmark), Salma Kuhlmann (Germany, organizer), Victoria Powers (USA), Bruce Reznick (USA), Konrad Schmüdgen (Germany) and Victor Vinnikov (Israel, organizer). The event was opened at 20:00 by Salma Kuhlmann who introduced the fishbowl discussion on behalf of the organizers, explaining the origin of this idea, the goals and the format of the discussion. The moderator introduced the main topic asking about the situation of women in mathematics in the countries of affiliation of each of the panelists and which are/should be the measure taken to improve it.

The discussion started with a brief overview of the situation in France from which emerged a first important issue: progress in reducing the gender inequality in mathematics is hindered by a general lack of memory of the achievements which have been already obtained. Therefore, any good change towards women does not become consolidated, but gets easily forgotten so that no further steps forward can really be done. An enlightening example of this phenomenon was given by Marie-Françoise Roy, who mentioned that when she was president of the French Mathematical Society she was surprised to be often addressed as the first woman in such a position. She actually was the fourth one. This interesting point was further discussed, leading to the observation of how unfortunately easy it is to see just what we are used to, and so to simply forget about the gender unbalance in mathematics. Thus, the necessity of breaking this **wall of invisibility** through concrete measures. For example, it was reported that in the Netherlands more than one hundred academic positions exclusively reserved to women were recently announced. This generated a lively discussion about the question of reserving positions to women, which solicited many people from the audience to join the fishbowl. Despite the fact that in some countries, like Germany or United States, it is illegal to announce a job vacancy to which only women can apply, several people expressed their support for such a measure recognizing it as a **positive discrimination** which is necessary to effectively induce a change. Indeed, some of the participants made the point that in Europe the number of women in science and in particular in mathematics has been steadily small for a long time, and the true problem is that women do not apply for positions. Therefore, they were strongly in favour of emergency measures to radically fix this problem, such as having positions accessible only to female candidates. Discussion of this point included a glimpse of the situation of women in mathematics in the United States, where huge steps have been made in the last two decades, even if in some

universities (including international top math departments) there are no female full professors. For example, Raul Curto described his role as equal opportunity officer in the College of Liberal Arts and Sciences at the University of Iowa, where the number of women in the department of mathematics has increased a lot in the last twenty years but has still not reached 50%.

The discussion moved then towards the ***situation of women in mathematics in Germany***, on which the participants to the fishbowl discussion had very divergent points of view. While for some Germany is making many steps forwards in terms of promoting and including women in mathematics, for others the current situation is actually very bad and the policies adopted by several German universities completely useless. Some of the participants shared their experience as female mathematicians in Germany during the last thirty years, pointing out not only a rise of the number of women in mathematics but also an improvement of the working conditions for women in academia. For example, it was mentioned that only twenty years ago many German research institutes did not offer any service for childcare and German male mathematicians still had the deep-rooted attitude of regarding female participants in math conferences as “accompanying persons”, with the duty of taking care of children while their husbands would prove theorems. The difference with the present situation was striking at this MFO workshop where we had 11 female participants (including 5 speakers and 2 organizers). In particular, one of them could easily bring her baby because of the assistance provided by the MFO administration, which also offered full lodging to her husband, who was taking care of her baby while she was attending the talks. These and more stories compared with the present situation made clear that positive changes were not easy, but happened because concrete actions were taken.

It was then natural to switch to the topic of the ***current measures taken in Germany to reduce the gender gap*** in mathematics. For many, the main cause of this persistent problem is the current German academic system, which is intrinsically unfriendly to women and in general unfriendly to families, since a person gets in average a permanent position in her/his forties and the childcare offered by universities is still quite expensive. For others, the current programs aiming to gender equality in German universities are merely theoretical tools which cannot be effective, because there is no legal way at the moment in Germany which allows to go towards a true change. For instance, the active recruitment and the rules imposed to hiring committees with the aim of increasing the number of women in the German departments were strongly criticized by them as possible incentives to illegal actions. These measures as well as the often failing dual career programs seem to produce in many cases the opposite effect of discouraging women rather than attracting them to work in German universities. Also the work of the equal opportunity council in several German universities was criticized as too concerned with theoretical gender questions and less with the actual needs of women (and other under-represented groups), as a result, creating hostile feelings towards pro-women programs. On the other hand, many of the participants strongly defended this kind of measures, making the point that actually if the situation has improved in Germany with respect to the past, it is exactly because of these pro-women rules and because of the work of the equal opportunity councils creating more awareness of the problems of women in mathematics. Measures in support of women in math were also defended as absolutely positive by some participants working in other countries who described concrete examples in which they really made a difference. For example, Bruce Reznick was witness in his career at University of Illinois at Urbana-Champaign of an increase from 30% to 40% among female graduate students and from 5% to 20% of minorities among US graduate students, thanks to the proactive recruiting of qualified students. There is also a recent policy that organizers of seminars, colloquia and

local conferences should aim for a diversified line-up of speakers. He also described a very successful dual-career program at the university which recently led to the hiring of three couples in the math department. (This program is available to same-sex couples as well.) Raul Curto and Monique Laurent also defended the active recruitment by means of examples illustrating its effectiveness in encouraging women to apply for positions, especially in cases when forms of insecurity made female candidates hesitant to apply for a position. Marie-Françoise Roy, Salma Kuhlmann, and Victoria Powers were underlining the importance of female role models and so of supporting initiatives promoting women like for example conferences specially addressing female mathematicians.

From here the discussion turned towards the analysis of how we can actually **educate the future generations in gender equality**. Some insisted on the importance of instilling in women more confidence towards their own mathematical skills already at the high school, through supportive actions by teachers and counsellors. For others, instead, the insecurity is actually a sign of humility and can bring women to higher achievement. For some, it might be that just for genetic reasons, women are less attracted than men towards an academic career and so there is no way of influencing this at an educational phase. Opposing this idea, others felt that women could be easily inclined to pursue a career in mathematics as doing research in this field gives the kind of flexibility a woman needs to have a family.

The recent change in the formal German language, which imposes the use of gender-neutral forms in all official documents, was also discussed. Some saw this measure as a useless complication which attacks the freedom of thought of the individuals. For others instead, more **care in the use of the language** when it comes to gender is necessary to educate to a fair attitude towards women. Several participants intervened in support of this thesis, bringing examples from their own countries, e.g. school text books breaking the classical gender stereotypes, writers randomly mixing the use of male and female in order to be more inclusive of diversity. Also, in languages in which there is no gender, it has been observed an almost total absence of bias in associating a gender to a profession.

This topic gave rise to a short discussion on the problem of **unconscious bias** which unfortunately is often neglected. It was stressed the fact that often men implicitly discriminate against women, but are not even aware of doing this. This kind of subtle discrimination has the effect of intimidating women and giving men more power. It was also underlined how many male mathematicians, despite of having never directly discriminated any woman, unconsciously benefited from the discrimination suffered by women in the past, simply because they had less competition. As a consequence, after centuries of injustices towards women, it was suggested that there should be no hostility now in trying to reintegrate women in mathematics through special supportive measures. Last but not least, it was highlighted how important it is to be aware that we have not yet reached gender equality and that we should not fall in the mistake of believing that we cannot go backwards.

After one hour and half the moderator concluded the discussion summarizing the main points. However, this was not actually the end of the event because the discussion went on during the evening. Many small groups continued to speak about the topics and to develop the suggestions raised during the fishbowl discussion.

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(on behalf of the organizers)