

Joint data-backed study on publication practices

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Goals of *Task 2* of the Gender Gap project

- explore effects of gender on publication behaviour
- in different academic fields in STEM
- across world countries and regions
- thus identify common and discipline-specific issues that might require interventions in view of the measured gender gaps
- provide access to aggregated data and interactive visualizations for the scientific community → democratization of data & explorations

Why study publications?

- scientific publications are major outlet for scholarly communication
- proxy for a researcher's scientific credo
- play a key role in achieving and maintaining a successful career in academia
- decisions on tenure and other academic promotions are mostly based on evaluations of the candidate's research portfolio
- thus, the understanding of publication practices is of great interest to academic institutions, science policy makers, and researchers alike

Analysis facets

- longitudinal development
 - overall proportions
 - career lengths via drop-out rates
 - productivity gap
- representation of women in selected (prestigious) journals
- proportion of women across different countries
- distribution across subfields

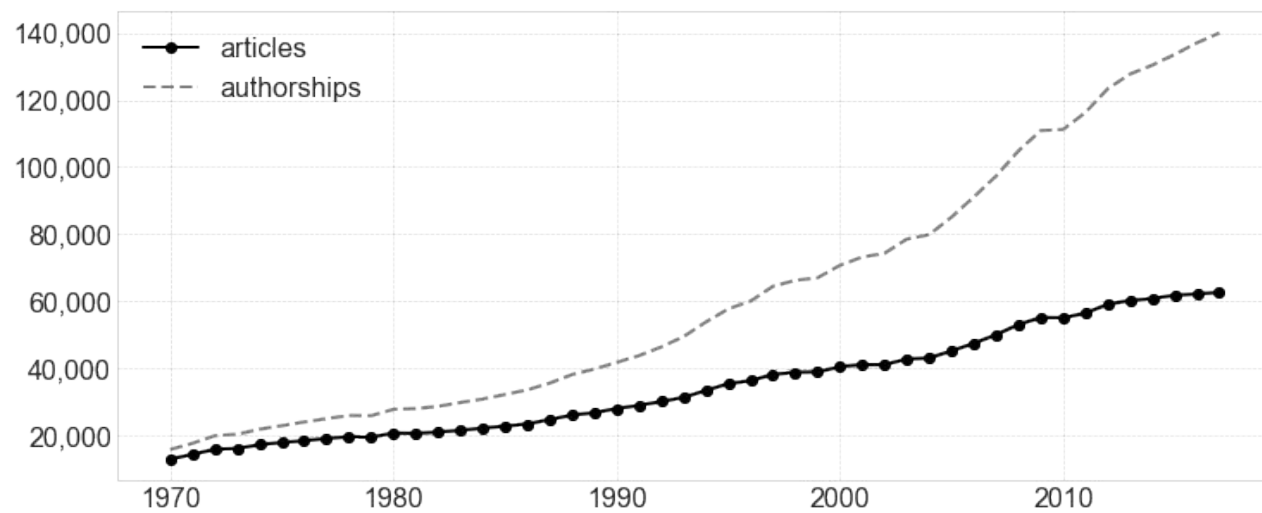
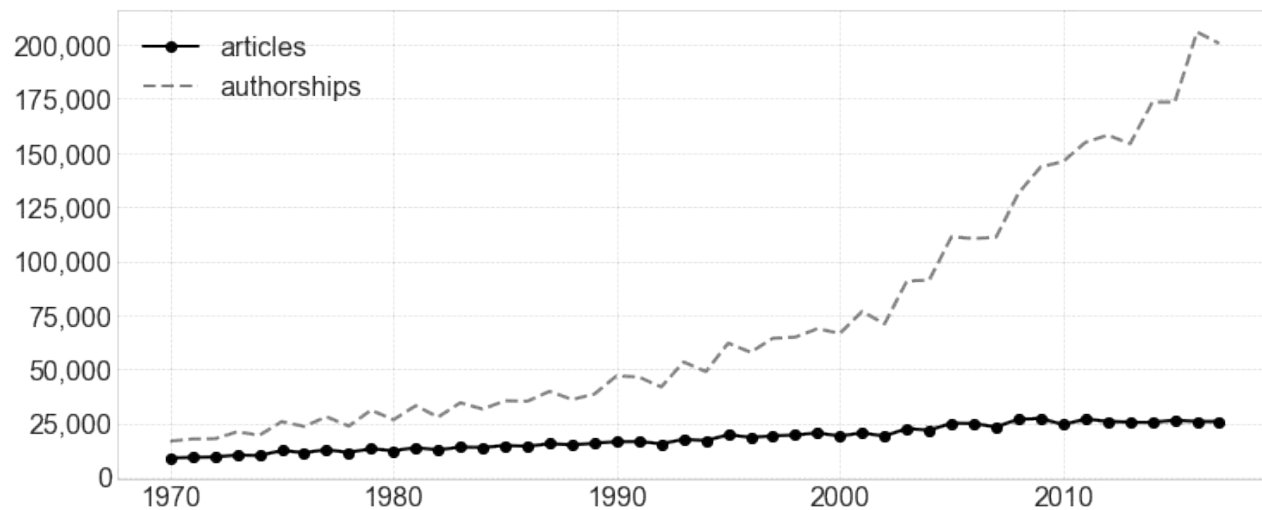
Data sources

- Astronomy and Astrophysics: **ADS** (SAO/NASA Astrophysics Data System)
- Mathematics: **zbMATH** (Zentralblatt MATH)
- (Theoretical) Physics (and more?): **arXiv** + CrossRef

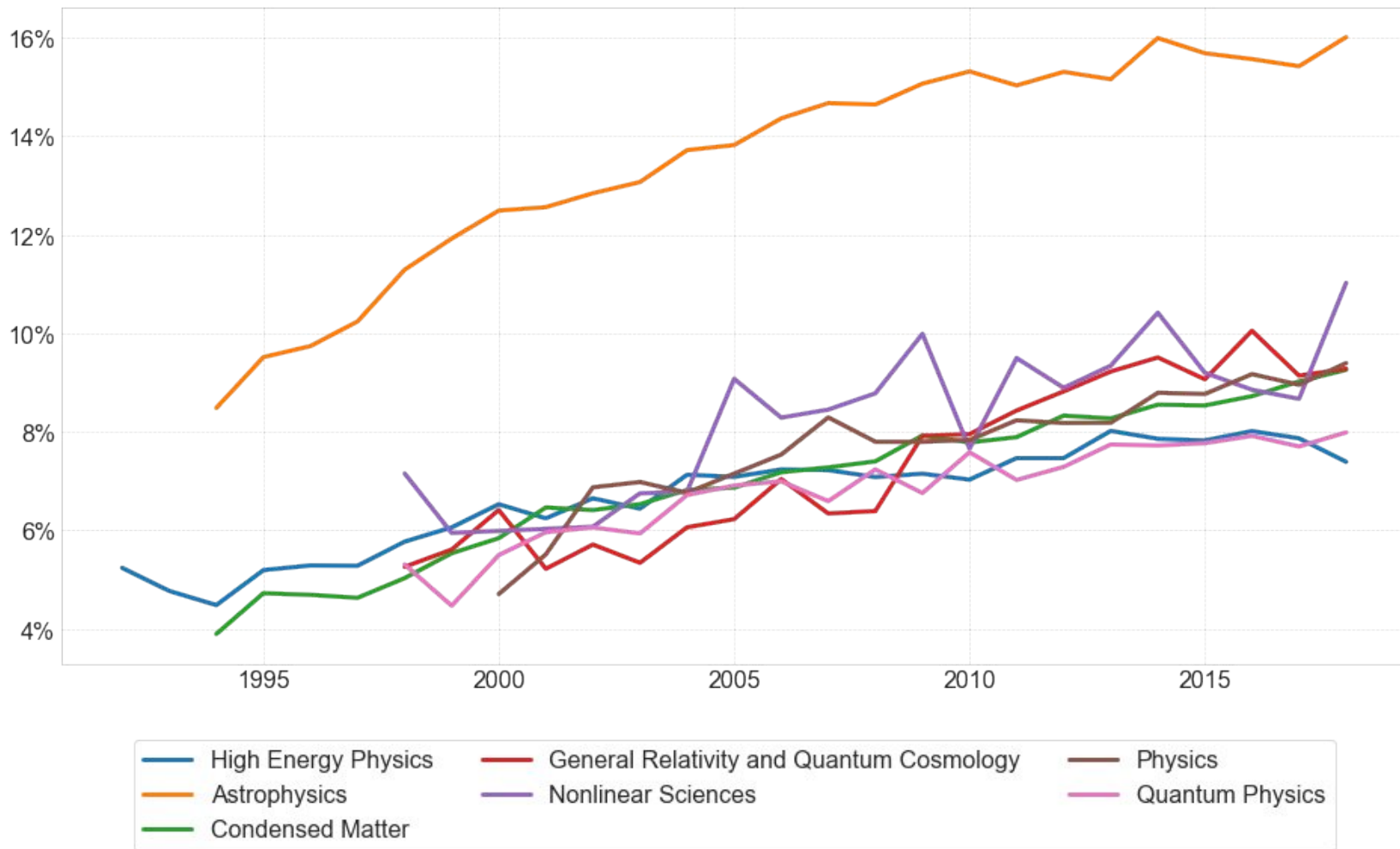
Concepts

- publication
- authorship
- author
- author profile
- affiliation → location
- inferred gender

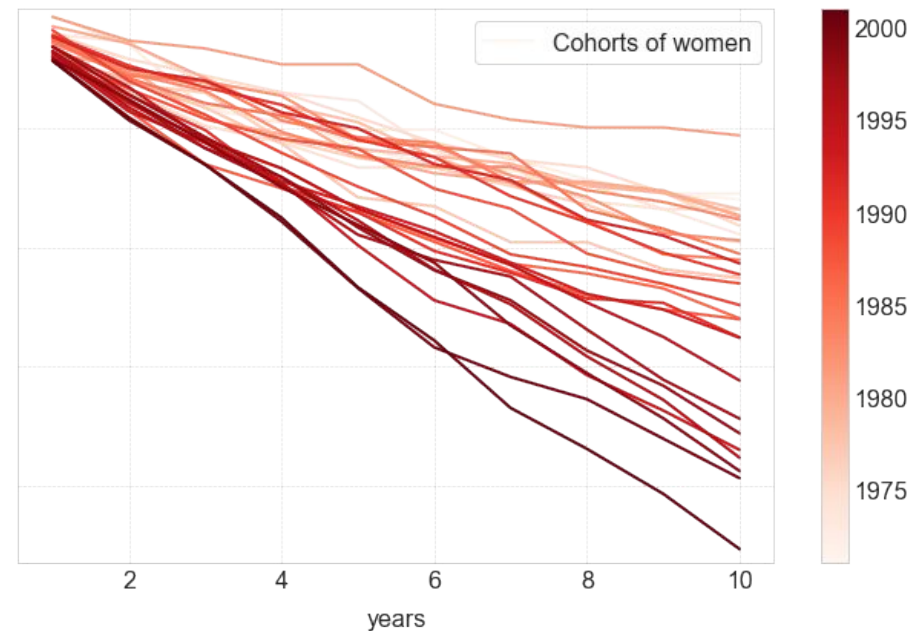
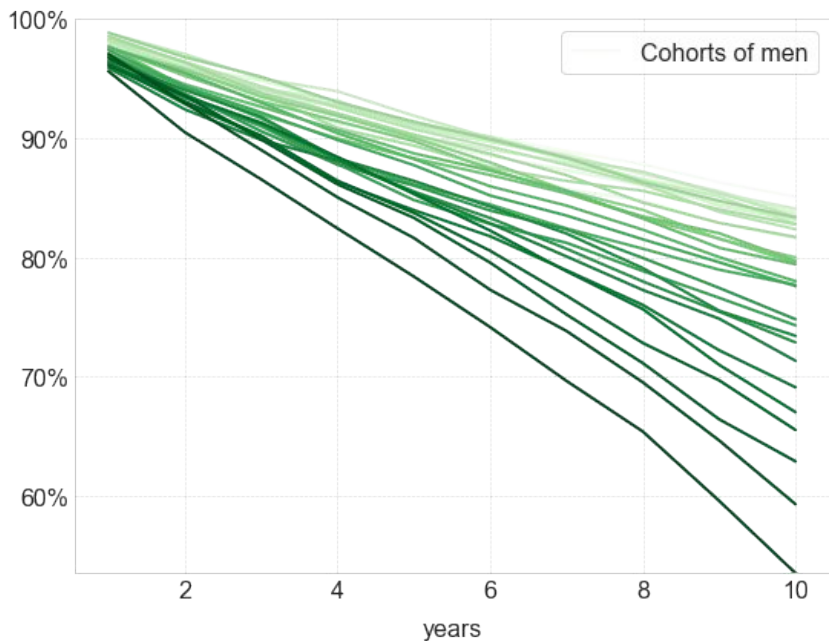
<http://gender-publication-gap.f4.htw-berlin.de/>



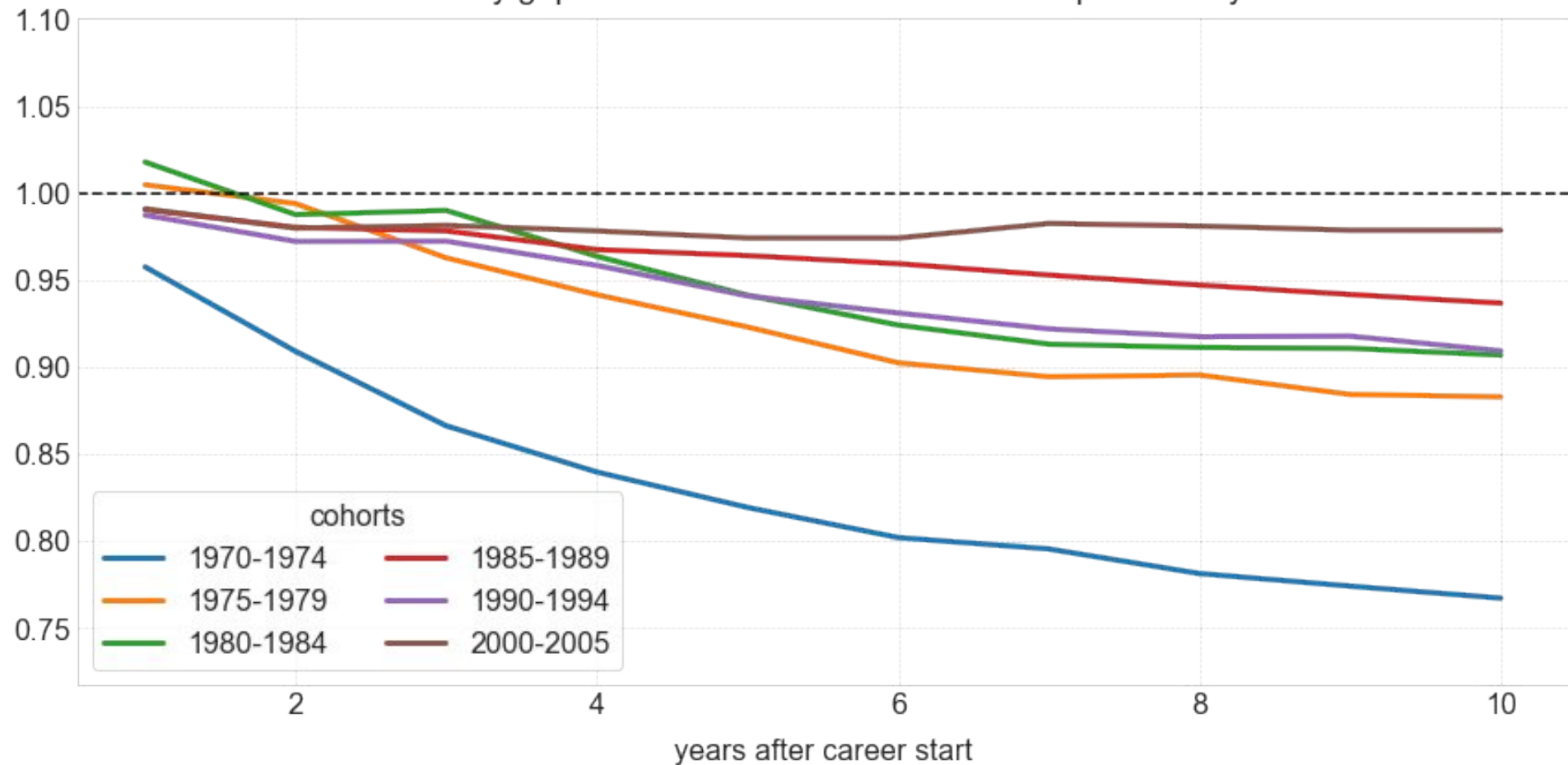
Proportion of authorships by women per subfield and year in arxiv physics



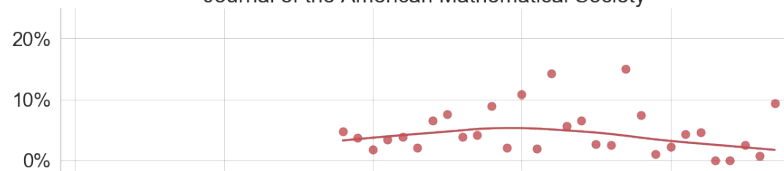
Publishing career lengths in Astronomy & Astrophysics



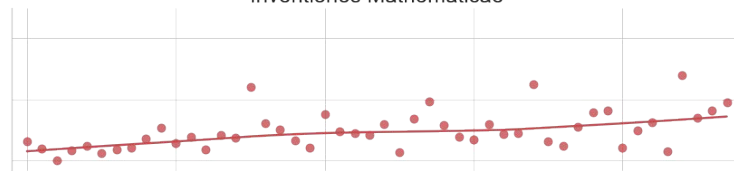
Productivity gap as a ratio of women's over men's productivity



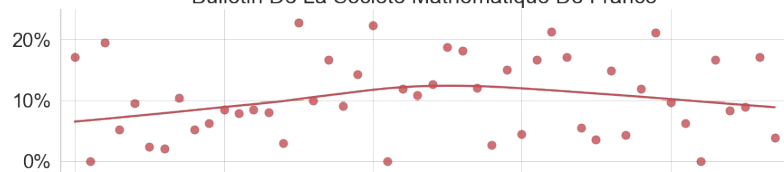
Journal of the American Mathematical Society



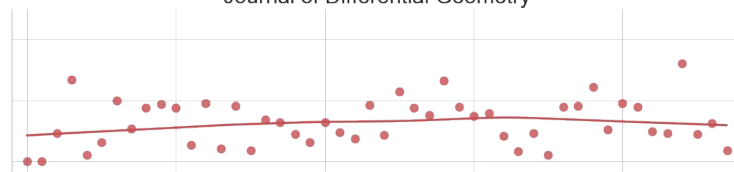
Inventiones Mathematicae



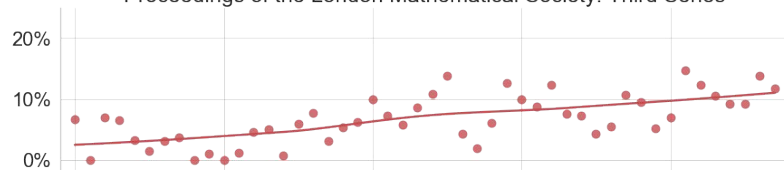
Bulletin De La Société Mathématique De France



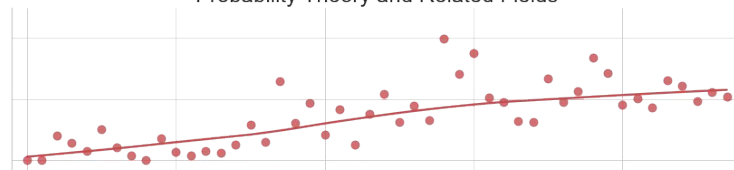
Journal of Differential Geometry



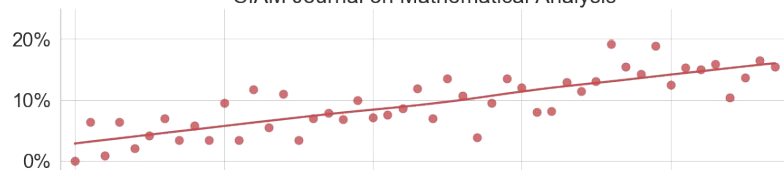
Proceedings of the London Mathematical Society. Third Series



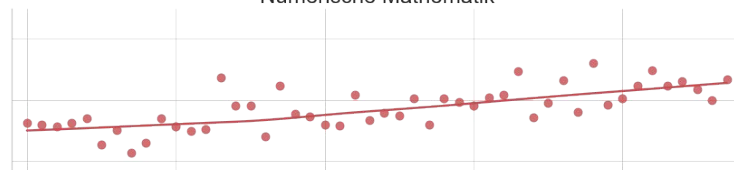
Probability Theory and Related Fields



SIAM Journal on Mathematical Analysis



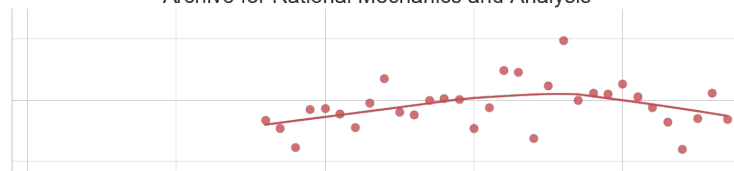
Numerische Mathematik



Journal of the European Mathematical Society

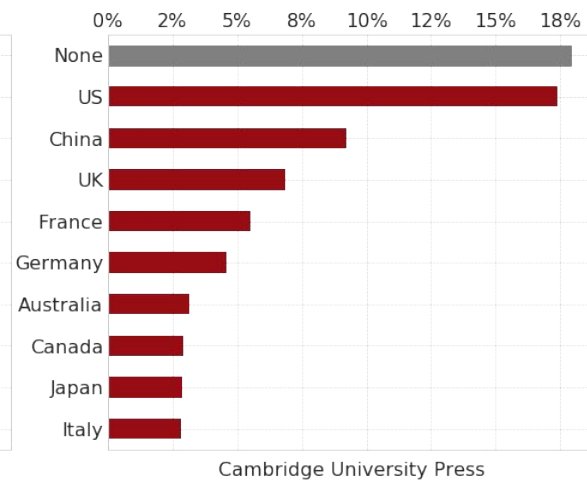
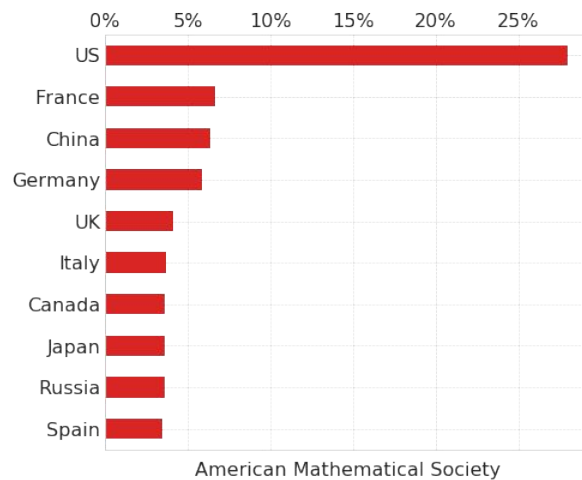
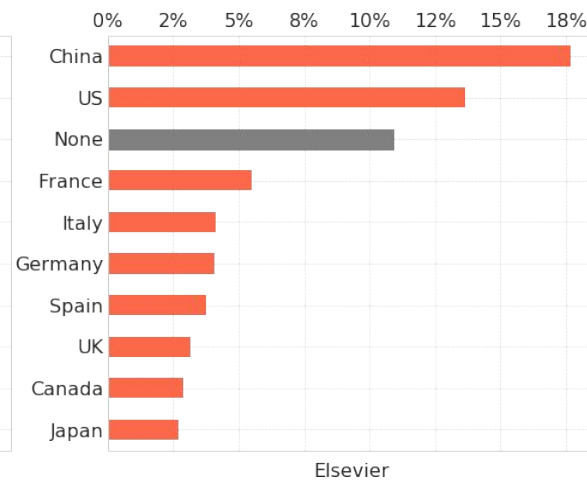
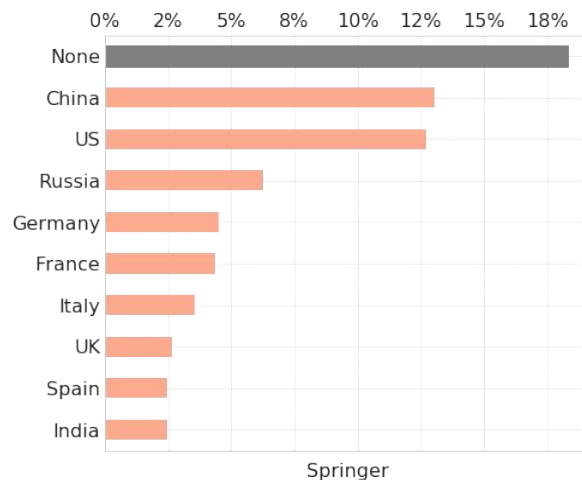


Archive for Rational Mechanics and Analysis

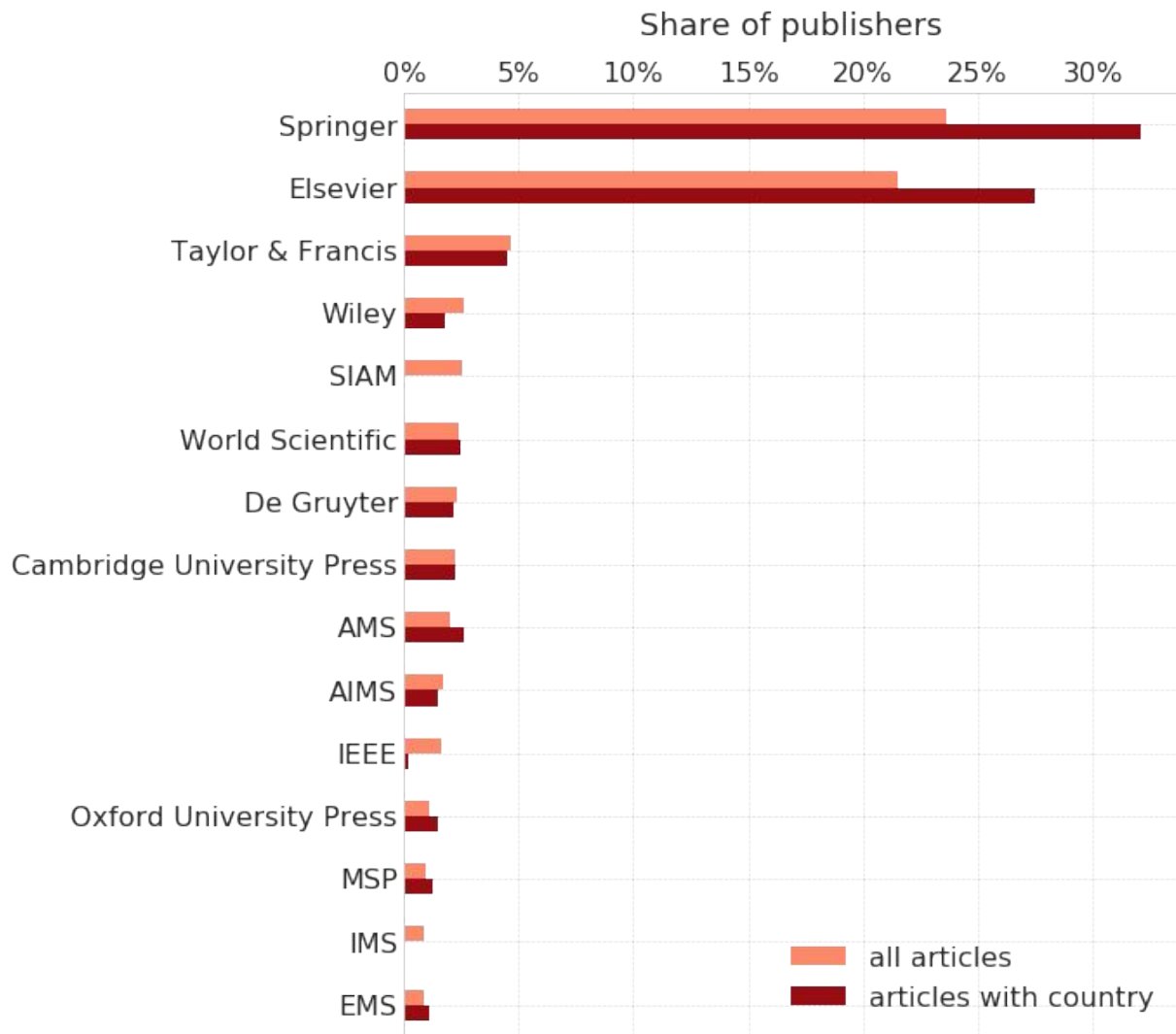


Country distribution in core math articles

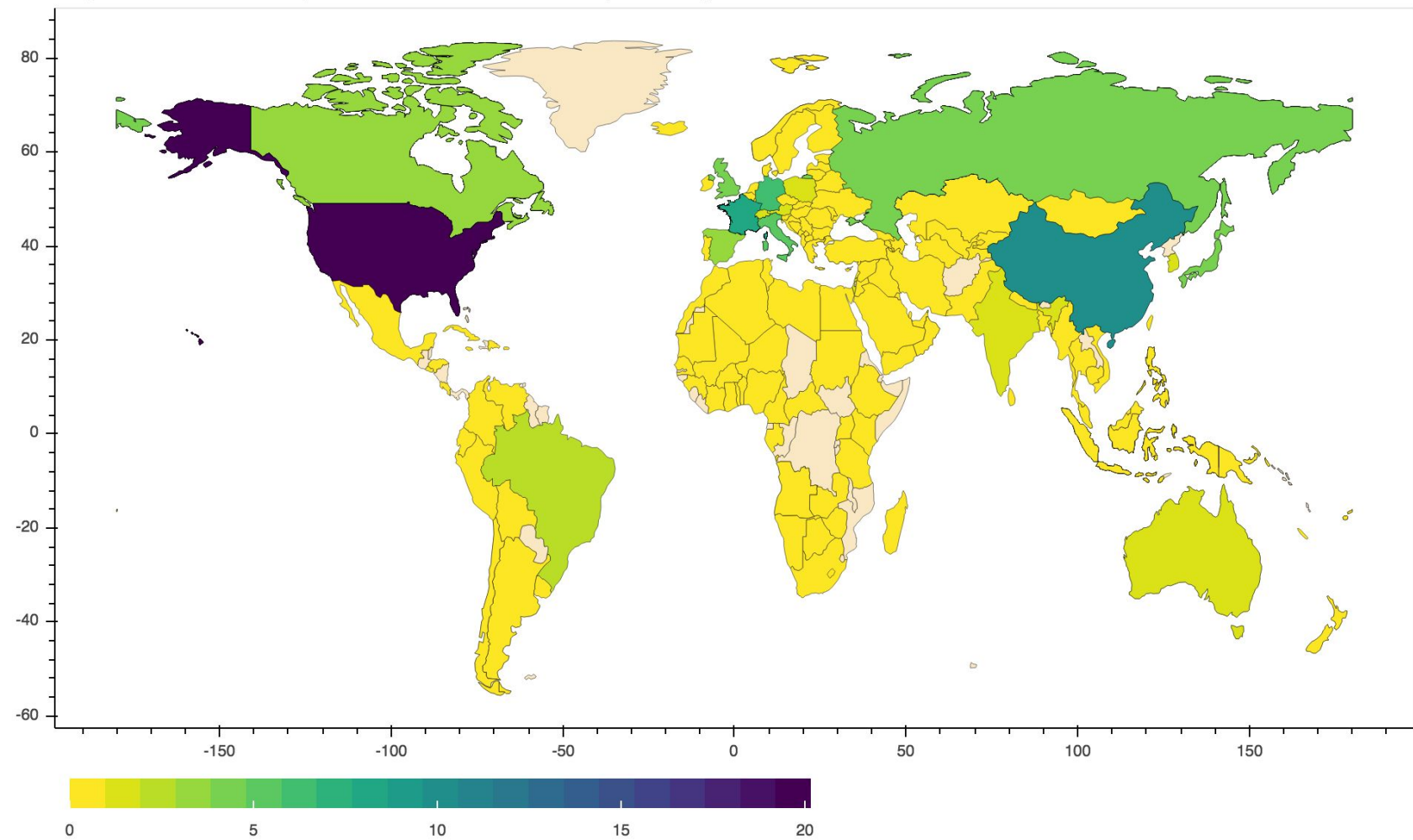
Publishers show
certain
regional trends



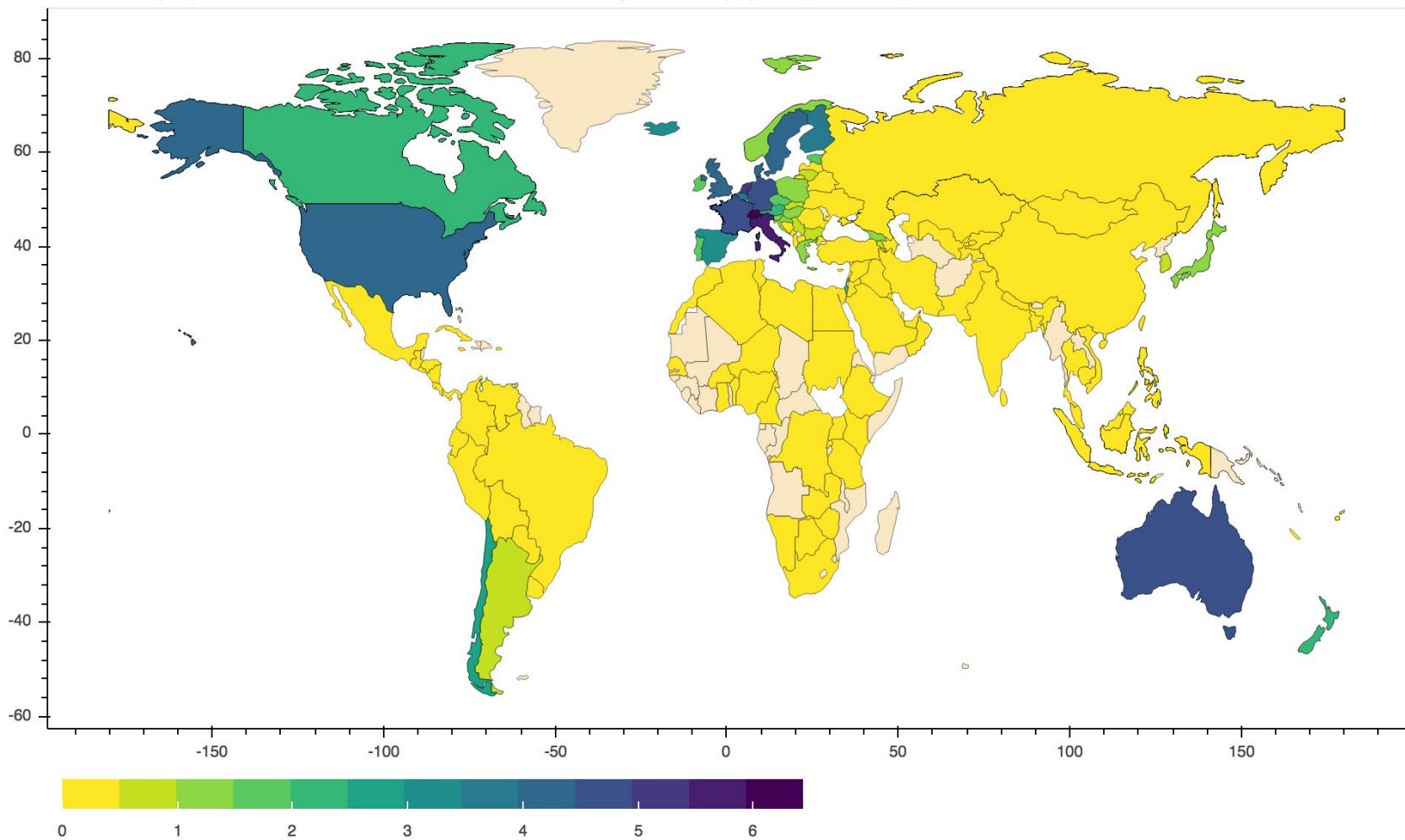
Evaluation of potential bias in country coverage in zbMATH



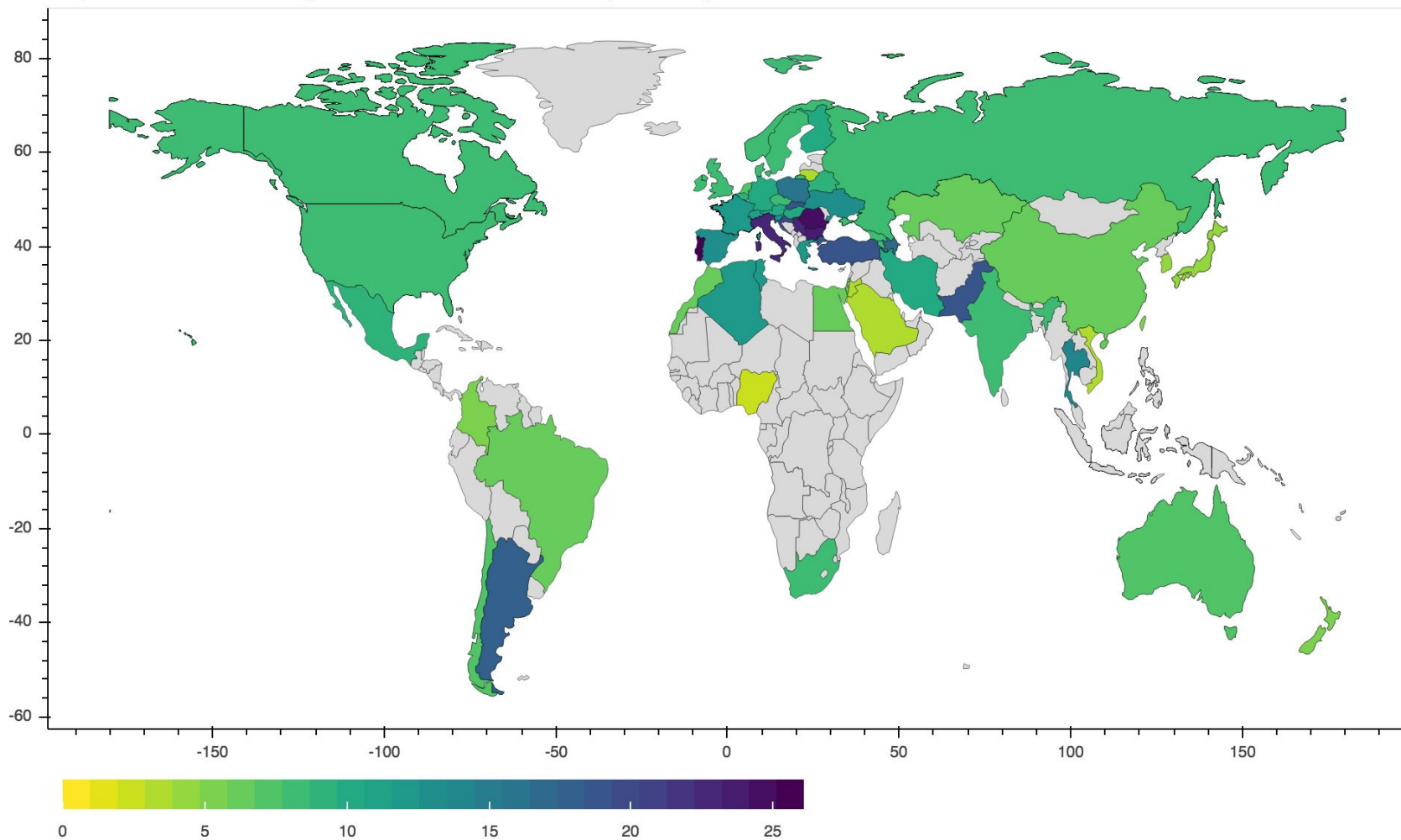
Proportion of countries in prioritized mathematics articles (2009-2018)



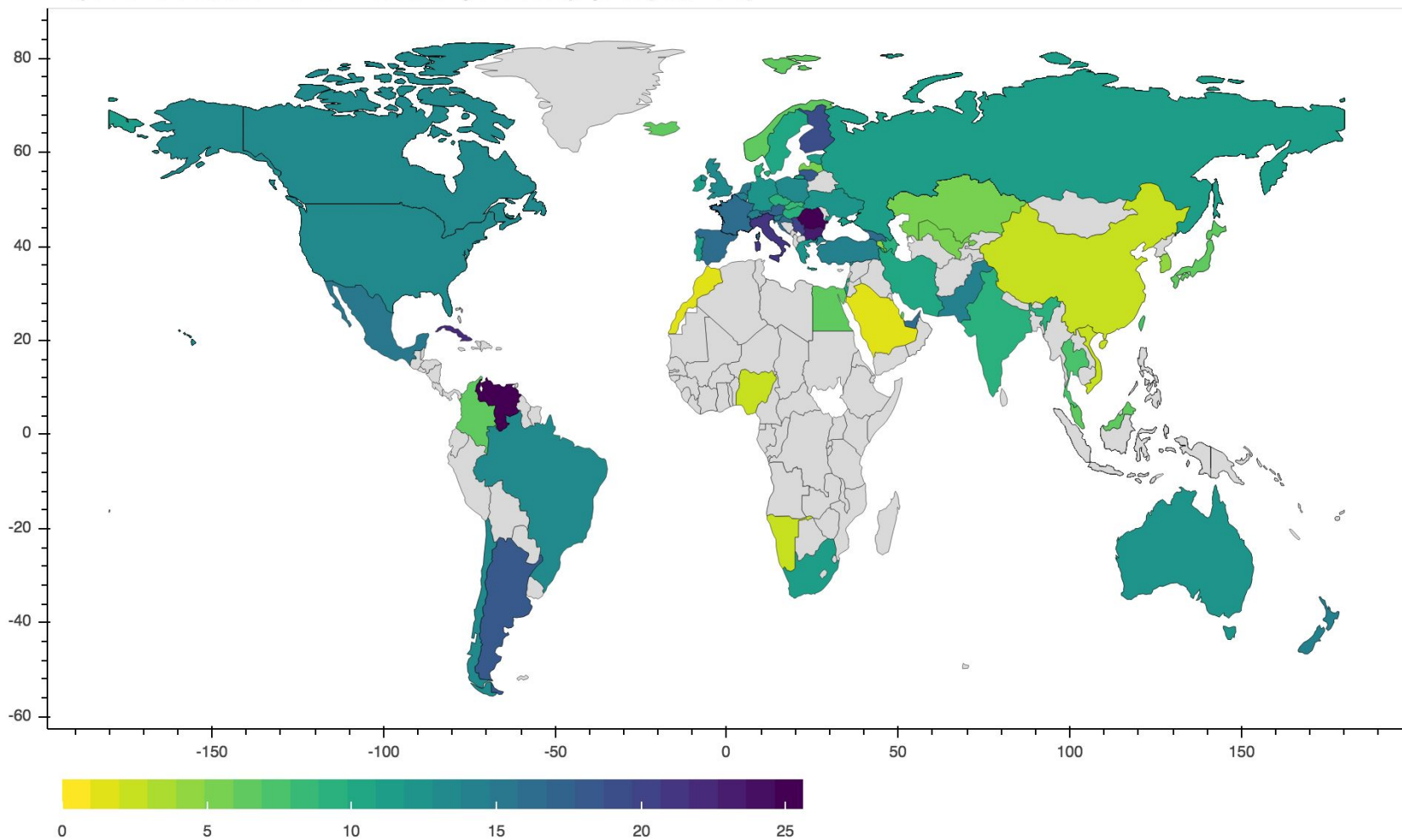
Normalized proportion of countries from articles in astronomy and astrophysics (2009-2018)



Proportion of women in single-author mathematics articles (2009-2018)



Proportion of articles of women in astronomy and astrophysics (2009-2018)



Reflections on methodology

- gender inference
- algorithmic data processing (geographic information, author profiles, ...)
- selection bias
- interaction with the field(s) & recognition of regional differences
- data incompleteness (e.g. author-level affiliations for maths)

Summary

- increasing proportions of women entering science with each passing year
- drop-out rates, which used to be higher for women, are converging on similar values for both genders
- productivity gap getting narrower, although recent cohorts show signs of stagnation. Numbers partially skewed due to the fact that those who publish extremely many papers are typically men
- in various renowned journals women are under-represented → begs for more transparency of the submission / reviewing process
- in Astronomy and Mathematics, highest relative proportions of women are in Europe, especially east and south-east; in almost all African and most Asian countries, women in Astronomy and Mathematics almost not represented

Outlook

- add / improve visualizations in the website
- collaboration practices in terms of gender and region
- access to renowned journals by country (and gender)
- migration analysis