Introduction of the volume

This volume gathers invited papers in the frame of the international online seminar From University Mathematics to Mathematics Education (FUMME) held from September 2021 to December 2022 (https://hal.science/FUMME/).

Research on the transition from secondary to university education (in the sense of postsecondary education) has been developed for a long time in various mathematical fields (Gueudet 2008). More recently, work has been carried out on what is referred to in the literature as "Klein's double discontinuity" (Winsløw & Grønbæk, 2013). This research is consistent with the view developed by Felix Klein, who pointed out that university mathematics and school mathematics appear to have too few connections (Kilpatrick 2019). Therefore, both teacher education and school-level mathematics education should evolve in ways that bring them into closer alignment.

This question is still relevant today (e.g., Winsløw & Grønbæk, 2013, Gueudet & al. 2016, Wasserman et al., 2023), especially since many future mathematics teachers share the idea that university mathematics does not meet the needs of their future profession (Gueudet & al. 2016). Therefore, there are two challenges: on the one hand, to highlight for students the links between university mathematics and school mathematics; on the other hand, to provide future teachers with access to effective tools, based on university mathematics, for their teaching work.

The nine papers in the RDM volumes of 2025 present recent research that addresses these two challenges and includes contributions from young researchers. They focus on various well-identified mathematical fields or topics (algebra, analysis, arithmetic, geometry, logic, proof and proving), opening avenues for the training of university teachers.

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