Barycentric configurations in real space

Hendrik Van Maldeghem
Ghent University
Hendrik.VanMaldeghem@UGent.be

Barycentric configurations are configurations with three points per line in real projective space such that (homogeneous) coordinates exist with the property that, for each line, the sum of the coordinate tuples of the three points on that line is the zero tuple. Such configurations turn up naturally and we develop some theory about them. In particular there exist universal barycentric embeddings and a general construction method if the geometry is self-polar. We apply these results to the Biggs-Smith geometry on 102 points, providing a (new) geometric construction of the Biggs-Smith graph making the full automorphism group apparent. We also mention a connection with ovoids.