

1154-14-793

Colby Kelln* (ckelln@umich.edu), **Talia Blum** and **Henry Talbott**. *Unlikely Intersections and Portraits of Dynamical Semigroups*.

Classical algebraic dynamics studies the behaviors of single rational functions under iteration. Of particular interest are the possible phase portraits of preperiodic points; Baker proved that with finitely many exceptions every preperiodic portrait can be realized by a complex rational function. Following recent work by Hindes and Hyde-Zieve, we investigate portraits for several rational functions simultaneously acting on the same point set. In this case, we no longer expect these portraits to be realizable for arbitrary rational functions. This leads to several questions, such as which portraits with several rational functions have realizations, and what properties do the spaces of all such realizations possess?

We used a computer cluster to determine realization spaces for all portraits with several points and two polynomials of low degree. Surprisingly, many portraits had realization spaces with higher than expected dimension. We will present three main results: a sequence of portraits with positive-dimensional realization spaces for multiple rational functions acting on arbitrarily many points; a classification theorem for the realizable dimension of two-image portraits; and a realizable portrait with 28 quadratic polynomials acting on four points. (Received September 10, 2019)