

COMPLETED WORK: JEFFREY S. MEYER

The most recent publicly available works are listed first. Dates on unpublished works are when the paper was first posted to the ArXiv.

SUBMITTED

(S1) **Title:** *Constructing Geometrically Equivalent Hyperbolic Orbifolds.*

Authors: D. B. McReynolds, Jeffrey S. Meyer, Matthew Stover.

Status: Submitted. 13 pages. July 2015.

Abstract:

In this paper, we construct families of nonisometric hyperbolic orbifolds that contain the same isometry classes of nonflat totally geodesic subspaces. The main tool is a variant of the well-known Sunada method for constructing length-isospectral Riemannian manifolds that handles totally geodesic submanifolds of multiple codimensions simultaneously.

File Access: arxiv.org/abs/1507.06708.

(S2) **Title:** *Systolic Surfaces of Arithmetic Hyperbolic 3-Manifolds.*

Authors: Benjamin Linowitz, Jeffrey S. Meyer.

Status: Submitted. 8 pages. June 2015.

Abstract:

In this paper we examine the geometry of minimal surfaces of arithmetic hyperbolic 3-manifolds. In particular, we give bounds on the totally geodesic 2-systole, construct infinitely many incommensurable manifolds with the same initial geometric genus spectrum in which volume and 1-systole are controlled, and analyze the growth of the genera of minimal surfaces across commensurability classes. These results have applications to the study of how Heegard genus grows across commensurability classes.

File Access: arxiv.org/abs/1506.08341.

(S3) **Title:** *The length spectra of arithmetic hyperbolic 3-manifolds and their totally geodesic surfaces.*

Authors: Benjamin Linowitz, Jeffrey S. Meyer, Paul Pollack.

Status: Submitted. 12 pages. May 2015.

Abstract:

In this paper we examine the relationship between the length spectrum and the geometric genus spectrum of an arithmetic hyperbolic 3-orbifold M . In particular we analyze the extent to which the geometry of M is determined by the closed geodesics coming from finite area totally geodesic surfaces. Using techniques from analytic number theory, we address the following problems: *Is the commensurability class of an arithmetic hyperbolic 3-orbifold determined by the lengths of closed geodesics lying on totally geodesic surfaces?*, *Do there exist arithmetic hyperbolic 3-orbifolds whose “short” geodesics do not lie on any totally geodesic surfaces?*, and *Do there exist arithmetic hyperbolic 3-orbifolds whose “short” geodesics come from distinct totally geodesic surfaces?*

File Access: arxiv.org/abs/1505.04652.

- (S4) **Title:** *Totally Geodesic Spectra of Quaternionic Hyperbolic Orbifolds.*
Authors: Jeffrey S. Meyer.
Status: Submitted. 22 pages. May 2015.

Abstract:

In this paper we analyze and classify the totally geodesic subspaces of finite volume quaternionic hyperbolic orbifolds and their generalizations, locally symmetric orbifolds arising from irreducible lattices in Lie groups of the form $(\mathbf{Sp}_{2n}(\mathbb{R}))^q \times \prod_{i=1}^r \mathbf{Sp}(p_i, n - p_i) \times (\mathbf{Sp}_{2n}(\mathbb{C}))^s$. We give criteria for when the totally geodesic subspaces of such an orbifold determine its commensurability class. We give a parametrization of the commensurability classes of finite volume quaternionic hyperbolic orbifolds in terms of arithmetic data, which we use to show that the complex hyperbolic totally geodesic subspaces of a quaternionic hyperbolic orbifold determine its commensurability class, but the real hyperbolic totally geodesic subspaces do not. Lastly, our tools allow us to show that every cocompact lattice $\Gamma < \mathbf{Sp}(m, 1)$, $m \geq 2$, contains quasiconvex surface subgroups.

File Access: arxiv.org/abs/1505.03643.

- (S5) **Title:** *On the isospectral orbifold-manifold problem for nonpositively curved locally symmetric spaces.*
Authors: Benjamin Linowitz, Jeffrey S. Meyer.
Status: Submitted. 4 pages. April 2015.

Abstract:

An old problem asks whether a Riemannian manifold can be isospectral to a Riemannian orbifold with nontrivial singular set. In this short note we show that under the assumption of Schanuel's conjecture in transcendental number theory, this is impossible whenever the orbifold and manifold in question are length-commensurable compact locally symmetric spaces of nonpositive curvature associated to simple Lie groups.

File Access: arxiv.org/abs/1504.01805.

- (S6) **Title:** *Totally Geodesic Spectra of Arithmetic Hyperbolic Spaces.*
Authors: Jeffrey S. Meyer.
Status: Submitted. 34 pages. August 2014.

Abstract:

In this paper we show that totally geodesic subspaces determine the commensurability class of a standard arithmetic hyperbolic n -orbifold, $n \geq 4$. Many of the results are more general and apply to locally symmetric spaces associated to arithmetic lattices in $\mathbb{R}$ -simple Lie groups of type B_n and D_n . We use a combination of techniques from algebraic groups and quadratic forms to prove several results about these spaces.

File Access: arxiv.org/abs/1408.2579.

PUBLISHED

- (P1) **Title:** *Division Algebras With Infinite Genus.*
Authors: Jeffrey S. Meyer.
Status: Bull. Lond. Math. Soc. 46 no. 3, (2014) 463-468.

Abstract:

We give an explicit construction of division algebras with infinite genus. We go on to show that there exists a field K for which (1) there are infinitely many nonisomorphic quaternion division algebras with center K , and (2) any two quaternion division algebras with center K are pairwise weakly isomorphic. In fact, we show that there are infinitely many nonisomorphic fields satisfying these two conditions.

File Access: arxiv.org/abs/1301.5632 or [Journal](#).

- (P2) **Title:** *Students' perceptions of lesson objectives in introductory mathematics courses taught by teaching assistants.*

Authors: [Matt Elsey](#), Jeffrey S. Meyer, [Vilma Mesa](#).

Status: Studies in Graduate and Professional Student Development, 13, 103-121. (2010).

Abstract:

We report on an investigation within calculus reform courses of the alignment of TAs stated lesson objectives with perceived lesson objectives by students and external observers. We contrasted the objectives stated by TAs prior to the lesson, objectives as understood by observers viewing the lesson, and objectives reported by students immediately following the lesson. We found discrepancies between these objectives that point to a mismatch between TAs intended objectives and what actually occurs in the classroom; students objectives are aligned with classroom activities but not with TAs stated objectives. We make suggestions to assist TAs in building lesson plans for reform-oriented classes.

File Access: [Journal](#).

- (P3) **Title:** *Teaching time savers: Activities that make every minute count.*

Authors: [Matt Elsey](#), Jeffrey S. Meyer, [Vilma Mesa](#).

Status: MAA Focus, 29(6), 12. (2009).

Abstract:

In this note, we propose a simple lesson planning technique that we believe can improve students' initial understanding and retention of concepts. The technique is appropriate for any course in which students have the opportunity to work on exercises individually or in groups during class time. These recommendations are based upon an investigation in which we saw frequent discrepancies between the objectives of the teacher and the objectives stated by the students in a written response following the lesson.

File Access: [Journal](#).