

Meeting: 1003, Atlanta, Georgia, SS 13A, AMS Special Session on Algebraic Geometry Codes

1003-14-1152 **Hiren Maharaj*** (hmahara@clemson.edu), Department of Mathematical Sciences, Clemson University, Clemson, SC 29634-0975. *Explicit constructions of algebraic geometric codes.*

Over the past decade there has been substantial research devoted to the explicit construction of curves over finite fields with many points. Consequently we now have a super abundance of such constructions with the primary motivation being the ultimate construction of algebraic geometric codes. However, very little work has been done on the *explicit* constructions of such codes. In this talk, I will exhibit a new construction of explicit algebraic geometric codes which go a long way toward providing a solution to this problem. The construction has the following advantages: for an explicitly given extension of the rational function field, one always obtains explicit bases and therefore an exact formula for the dimension of the code, genus computation is unnecessary for estimating the parameters of the code, the minimum distance of these codes can be bounded below by the usual Goppa lower bound for minimum distance and furthermore good upper bounds on the minimum distance of the codes are given. The codes constructed here are always subcodes of Goppa codes and in many cases they coincide with Goppa codes. Furthermore, the ideas used in the code construction are adapted to give sharp upper bounds for the minimum distance of a large class of Goppa codes. (Received October 04, 2004)