

Integrable System Seminar

Systems of Differential Equations for Modular Forms

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Abstract

In his 1914 paper "On certain arithmetic functions" Ramanujan showed that Eisenstein series on the full modular group satisfy a coupled system of nonlinear differential equations. His clever proof is based on the Fourier expansions for certain elliptic functions. Ramanujan's work has inspired a number of analogous differential equations for modular forms on subgroups of the modular group. This lecture will introduce modular forms, Eisenstein series, and present Ramanujan's proof for the differential equations satisfied by the classical Eisenstein series. Ramanujan's argument is surprisingly elementary, employing only basic trigonometry and simple facts about infinite series from a second-semester calculus course. We will discuss how Ramanujan's argument can be generalized to derive systems of differential equations for other classes of modular forms.

Date: **Monday, October 12, 2009**

Time: 3:00pm–4:00pm

Place: MAGC 1.410

For further information or for special accommodations, please contact Dr. Virgil Pierce via email at piercevu@utpa.edu.