Abstract

The arithmetic of modular forms for congruence subgroups of $SL(2, \mathbb{Z})$ has been a central theme in number theory for over one century. It has close connections with many branches of mathematics. The proof of Fermat's Last Theorem by Wiles has brought the field to a new climax. The arithmetic of modular forms for noncongruence subgroups, on the other hand, has not attracted much attention in the past. However, the research in this area has been reinvigorated in the past decade.

This talk is an overview of the progress on modular forms for both congruence and noncongruence subgroups as well as the connections between these two kinds of forms.