*Student
Seminar*

Pi Mu Epsilon
& GAMECOCK MATH CLUB

What Does a Nonabelian Group Sound Like?

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Underlying many digital signal processing (dsp) algorithms, in particular those used for digital audio filters, is the convolution operation, which is a weighted sum of translations $f(x-y)$. Most classical results of dsp are easily and elegantly derived if we define our functions on Z/nZ, the abelian group of integers modulo n. If we replace this underlying "index set" with a nonabelian group, then translation may be written $f(y^{-1}x)$, and the resulting audio filters arising from convolution naturally produce different effects than those obtained with ordinary (abelian group) convolution.

The aim of this project is to explore the idea of using the underlying finite group (i.e., the index set) as an adjustable parameter of a digital audio filter. By listening to samples produced using various nonabelian groups, we try to get a sense of the "acoustical characters" of finite groups.

URL: http://soundmath.github.io/GroupSound/

Tuesday 25$^{\text{th}}$ February 2014
6:30 pm
LC 310

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