CCSU

DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, December 9

3:00 – 4:00 PM

Maria Sanford, Room 101

AN EXPLORATION OF THE HEAT EQUATION AND APPLICATIONS TO MANTLE CONVECTION

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Abstract: The heat equation is utilized in solving questions regarding mantle convection in the field of Geodynamics. But the heat equation has a remarkable history as well, largely involving Jean Baptiste Joseph Fourier and his well-known Fourier series.

We will begin by introducing the theory of mantle convection. We will follow this with an exploration of heat itself and the development of the heat equation. This will involve a history of the man at the center of this development, Jean Baptiste Joseph Fourier.

The curious case of the rejection of Fourier series by the great mathematicians of his time will lead us to discuss Fourier's history and why his theories were initially rejected. This will also lead to a discussion of how he was finally able to convince great mathematicians like Laplace of his accuracy. In addition, this will solidify the claim that Fourier series gave birth to the field of Analysis.

We will follow this discussion by developing solutions to the heat equation on closed intervals, the real line, and the real half-line. Then we will discuss the differences in how the heat equation is utilized in geodynamics as well as proving the equivalence of these equations. Finally, we will discuss how the application of the heat equation to the age of our planet proved the theory of mantle convection.

To join us online use the following link: https://ccsu.webex.com/meet/gotchev

For further information: gotchevi@ccsu.edu; 860-832-2839; https://web.ccsu.edu/colloquium/