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Myrto Barrdahl: The Heat Equation

Handledare: Andrzej Szulkin

Sammanfattning

Heat is distributed in a body the same way that a fluid or gas would be flowing from parts of lower concentration to parts of higher concentration - a process known as diffusion. The transfer of thermal energy in a domain Ω in R^n is carried out by means of conduction and can be described by a partial differential equation known as the heat conduction equation. The aim of this thesis is to investigate existence and uniqueness of solutions to this equation in R^n and in bounded domains in R^n. This is carried out using theory of distributions and weak solutions, separation of variables and Galerkin approximation. Two different types of solutions to a non-linear diffusion equation, known as the Porous Medium Equation, are also presented.