

SELF-SIMILAR SOLUTIONS FOR THE HEAT EQUATION

MARCELO F. FURTADO

Universidade de Brasília

Resumo

We are concerned with the existence of self-similar solutions for the heat equation

$$-\Delta - \frac{1}{2}(x \cdot \nabla u) = |u|^{p-2}u, \quad x \in \mathbb{R}^N,$$

where $N \geq 3$ and $2 < p < 2N/(N - 2)$. It can be showed that this problem arises in finding self-similar solutions for the nonlinear heat equation. By using variational methods we obtain solutions which rapidly decay to zero at infinity. In the 2-dimensional case, we are able to consider nonlinearities with exponential growth. Finally, we present some results for the case of the half-space with an appropriated nonlinear boundary condition.