LAPLACE'S EQUATION IN THE HALF-SPACE WITH NONLINEAR BOUNDARY CONDITIONS

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The talk will deal with stable nonconstant solutions of Laplace equation in a half-space with nonlinear boundary conditions, or the equivalent problems for the energy functional.

We will describe the recent results of the paper [1], concerning existence, uniqueness and stability properties for solutions to this problem that are monotonic in some direction parallel to the boundary.

The knowledge of these monotonic solutions, also called layer solutions, has also been used recently to obtain some more results on the existence of stable nonconstant solutions for this problem in bounded domains. These results, that are due to X. Cabré and N. Cònsul will also be commented, specially in relation with previously known results.

In all of these works on bounded domains, one of the main goals has been to relate the geometry of the domain (a domain with holes, a ball, a dumb-bell shaped domain, a square, or others...) with the property of the existence or not of these stable nonconstant solutions.

References

[1] Cabré, X. and Solà-Morales, "J.: Layer solutions in a half-space for boundary reactions," *Comm. Pure Appl. Math.*, **58**, (12) 1678–1732 (2005).

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