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Neumann Comparison Results in Cylindrical Domains

In this talk we will use the the star-function method of Baernstein to obtain Neumann comparison results in cylindrical domains. We begin with a bit of history of comparison results, starting with the classical (Dirichlet) results of Talenti. Our main result compares the solutions of two PDEs, one with given initial data, and one where the data has been Steiner symmetrized in one direction. We show that the solution of the symmetric problem exhibits larger convex means, among other things. We also discuss physical applications and applications to the hot spots problem.