Special Issue:
Second Order Subelliptic PDEs

GUEST EDITORS

Giovanna Citti, Dipartimento di Matematica, Alma Mater studiorum, Università di Bologna, Italy Giovanna.citti@unibo.it

Sergio Polidoro, Dipartimento di Scienze Fisiche, Informatiche e Matematiche, Universita' degli Studi di Modena e Reggio Emilia, Italy sergio.polidoro@unimore.it

DESCRIPTION

We propose this special issue on the occasion of *Ermanno Lanconelli's* 80th birthday, to retrace the research activity he has covered during his career.

We intend to focus this special issue on **Second Order Subelliptic Partial Differential Equations**: a vast class of linear and nonlinear PDEs whose associated second order form has the least eigenvalue identically zero. These equations arise in different research areas: stationary ones allow to express geometric properties of contact and CR structures. Evolutive subelliptic operators naturally arise in Kinetic Theory, in Stochastic Theory and in its applications to several research areas, including Finance, Chemistry, Biology, Theory of Vision.

The first results in this field are due to Hormander, Folland, Rothschild, Stein, Bony, Lanconelli and Franchi, who introduced a new geometric approach and provided us with an unifying framework to build the regularity theory for this kind of operators. In particular the sub-Riemannian distance, tailored on the operators has been introduced to study the properties of the solutions. Important results have been obtained on the fundamental solution, which assigns to its level sets the role of balls of the space, and allows to recover in this new geometric setting most results of classical potential theory.

Despite the important results already achieved, this is still an active and vital research field with many interesting open problems, such as regularity of linear and nonlinear, stationary and evolutive equations, existence and estimates for the fundamental solution, mean value,

representation formulas and rigidity results. Boundary regularity is still open even for the Dirichlet problem, due to the presence of characteristic points at the boundary.

Particularly challenging issues are Geometric PDEs, free boundary problems, differential forms associated with the Rumin complex. Recently also optimal transport problems have been studied in this geometric setting.

The aim of this special issue is to collect the contribution of the most established researchers in the field who are leading the research activity in the area described above.

HOW TO SUBMIT

Submissions to this special issue are per invitation only.

All submissions to the special issue must be made electronically at http://www.editorialmanager.com/agms and will undergo the standard peer review process.

Before submission please check Instructions for Authors and Publication Ethics.

When submitting your paper please choose "SI Second Order Subelliptic PDEs" type of paper.

The deadline for the submissions is ***February 29, 2024*** but individual papers will be reviewed and published online on an ongoing basis.