MA4198 PROJECT PROPOSAL (PROJECT CUM SEMINAR GROUP)

SUPERVISOR'S INFO

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TITLE

Computable (and non-computable) mathematics

BRIEF DESCRIPTION OF PROJECT

Classical examples of algorithmically unsolvable problems include Hilbert's tenth problem (can we decide if a given Diophantine equation has integer solutions?) and the word problem (can we decide if a given word in a given finitely generated group is the identity?) Tools from computability theory allow us to quantify the extent to which they are unsolvable.

EXPECTATION/S

Students will begin by learning the basics of computability theory. Then they will choose one or more problems to study in detail (see list by Poonen). Such problems can be found in many areas of mathematics, such as number theory, geometry, topology, algebra, analysis, and combinatorics, so the project direction can accommodate students' interests to an extent.

PREREQUISITE/S (at level 3000 or below, with at most one course at level 3000)

None

READING REFERENCE/S

"Undecidable problems: a sampler" by Bjorn Poonen, "Reverse Mathematics" by Dzhafarov, Mummert