

Elementary Number Theory: from a harmonic analyst's perspective

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DATES: 16, 23, 30 november 2011**TIME:** 12:00-14:00**PLACE:** IMUB**ABSTRACT:**

In these lectures we plan to develop a profitable point of view for various notions and problems arising in elementary number theory. It is well known that there are many and often deep connections between harmonic analysis and number theory and these connections move in both directions. One direction is clear; for many problems in harmonic analysis, there are number theoretic issues which lie at the heart of the matter and so techniques and results from number theory can have a strong influence on harmonic analysis.

In these lectures we would like to explore the other direction. We will show that there are striking similarities between some of the most basic and fundamental objects in euclidean harmonic analysis (for instance, oscillatory integrals and sublevel sets) and basic objects of study in elementary number theory (exponential sums and solutions to congruences). We will borrow some recent ideas from harmonic analysts, most notably Phong/Stein/Sturm and Ikromov/Muller, who have shed bright light of the "structure" of the basic objects (oscillatory integrals and sublevel sets) in harmonic analysis and investigate how these structural insights play out for the corresponding objects of exponential sums and congruences in number theory.

No previous knowledge of number theory is assumed (or for that matter, no technical knowledge of harmonic analysis is assumed) for these lectures. We will try to keep things elementary, taking a metric, structural perspective for our analysis.