

Bringing pure and applied analysis together via the Wiener-Hopf technique, its  
generalisations and applications

Isaac Newton Institute Cambridge

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Short Report

The motivation for this one-month programme was to build connections between different strands of the Wiener–Hopf method. This fascinating technique was conceived around 90 years ago and has since contributed to numerous branches of mathematics. Founded on highly abstract concepts, the method has applications in electromagnetic wave diffraction, fracture dynamics, probability theory, aeroacoustics, machine learning and many other fields. Over time, different research communities that employ the Wiener–Hopf method have developed their own terminology, and have focused their research in different directions, leading to a diverse set of related open problems.

The first week consisted of diverse, stimulating and intensive courses with lectures delivered by experts in pure mathematics, applied mathematics and numerical analysis. This was followed by a week of conference-style talks with cutting-edge presentations from leading researchers. The last two weeks were dedicated to informal interactions, collaborations, discussion of funding opportunities, and study groups that concentrated on particular research topics. This was an intensive and highly motivating month of our careers, and we could not have achieved so much in such a short time without the friendly, welcoming and productive environment of the INI and the aid of its capable staff.

At least one grant proposal is currently being developed, two further conferences are being proposed and many new collaborations have been stimulated. Our next task is to publish a special feature of Proceedings of the Royal Society A consisting of survey and research papers that have arisen as a result of this programme.