

Mini-course 3: symmetrizers

jeudi 16 avril 2026 10:45 (1h 30m)

The aim of this lecture is to present new results concerning the well-posedness of hyperbolic systems defined in a domain with a corner. In the canonical half-space geometry, Kreiss's theory [1970] characterizes well-posed problems in terms of an algebraic condition, the so-called uniform Kreiss–Lopatinskii condition. The main contribution of Kreiss's work is the construction of a so-called Kreiss symmetrizer, which reduces the proof of the a priori energy estimate to a simple integration-by-parts argument.

Although it seems to be a natural extension, the well-posedness issue for hyperbolic corner problems is a rather open question since the seminal work of Osher [1973].

Here, we introduce a new notion of symmetrizer adapted to corner problems, which makes it possible to characterize well-posed problems in terms of a non-intersection condition. In this way, Kreiss's half-space theory is extended to corner domains.

The lecture will be divided into four sections of increasing technical difficulty, all relying on the same fundamental ideas. Section 1 is devoted to the Cauchy problem. Section 2 extends the ideas of Section 1 to the half-space problem. Section 3 considers the strip problem, which serves as a toy model for studying interactions arising from multiple boundaries. Finally, Section 4 is devoted to corner domains and relies heavily on the toy-model analysis developed in Section 3.

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