

As is well known, a problem is said to be well-posed in the sense of Hadamard when a unique solution exists and depends continuously upon the data. The definition is made precise by stipulating not only the function spaces in which the solution and data are to lie but also the measures and notion of continuity.

A problem that is not well-posed is said to be ill-posed. Although nineteenth-century mathematicians contributed to the early study of ill-posed problems, it is generally agreed that the subject came to prominence only after Hadamard had formulated his well-known definition. Unfortunately, he developed an adverse view of the subject which, on becoming widely accepted, had the effect of inhibiting further study. His objections were grounded in his celebrated counterexample of the Cauchy problem for Laplace's equation. In order for there to be global existence of the solution Hadamard demonstrated that the Cauchy data must satisfy a certain compatibility relation but even in the unlikely event of the relation being satisfied he further showed that the solution in general does not depend continuously on the data.

Such behaviour convinced Hadamard that ill-posed problems lacked physical relevance and hence should be ignored. This became the prevailing attitude, and consequently, in partial differential equations at least, activity became confined to the standard initial boundary value problems. It was only the growing insistence for a precise theoretical understanding from the applied sciences, principally geophysics and computing, that rekindled mathematical interest