The Study of Green's Functions as a tool for solving partial differential equations with an emphasis on physical applications

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Abstract

The aim of the thesis is to introduce the term Green's functions which is not only a mathematical term but also useful tool for physical applications. Green's functions can be determined for both ordinary and partial differential equations. The thesis mainly examines the latter case. The thorough study of Green's functions requires a great knowledge in the fields of distribution and operator theory this is why both of these branches of mathematics are briefly reviewed in the thesis. It is highlighted that problems arise when one starts to study Green's functions in depth. The lack of concise mathematical texts studying this branch of mathematics is a great problem. Readers interested in the theory can often find texts made for physicists which often lack formal mathematical deduction. On the other hand texts and books made for mathematicians are too abstract hence the reader can hardly develop a clear view of the topic. In this thesis a strong effort is made to harmonise to two different viewpoints of a mathematician and a physicists associated with Green's functions. The problems which arise during this attempt of harmonizing these two viewpoints are highlighted giving help to anyone who wants to study this field. At the end certain suggestions are also made which could help to resolve the problems stated above. As it is about harmonising two viewpoints physicists and mathematicians can easily understand it even tough neither the mathematical theory nor the physical applications are not neglected.