# THE PROBLEM TO FIND THE NONLINEAR NONSINGULAR SOLUTIONS OF MATHEMATICAL PHYSICS

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The solutions of Laplaces equation were created by using the singular Newtons law of gravitation that gives infinite value by zero distance between particles. There could be taken different nonsingular laws which can create another nonlinear equations of mathematical physics. The solutions of this equations could be considered and compared with traditional solutions of potential theory.

The solutions of Laplaces equation with boundary point singularities could be regarded as approximations to the nonlinear nonsingular solutions of different physical problems. It is possible to suggest a method to find these nonsingular solutions using additional condition that is fulfilled for any nonsingular solution.

The similar problem exist in fracture mechanics. The Griffiths problem for the tension of a linear elastic plate has singular infinite solution for stresses near the tip of a crack. Using additional condition the zero J-Integral that is satisfied for all bounded elastic potentials one can get the stress concentration factor that corresponds to experiments of Inglis and Griffiths. They write about these experiments in the paper that is regarded as the start of new theory of fracture mechanics.

This approach could be transformed to another problems of mathematical physics such as heat transform or electromagnetic field.

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