

# Abstract differential equations (Research notes in mathematics)

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## A Note on Integral Transforms and Partial Differential Equations

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**Abstract.** In this study, we apply double integral transforms to solve partial differential equation namely double Laplace and Sumudu transforms, in particular the wave and poisson's equations were solved by double Sumudu transform and the same result can be obtained by double Laplace transform.

**Mathematics Subject Classification:** Primary 35G15, 44A85; Secondary 44A35

**Keywords:** Laplace transform, Sumudu transform, convolution

### 1. INTRODUCTION

The topic of partial differential equations is very important subject yet there is no general method to solve all the PDEs. The behavior of the solutions very much depend essentially on the classification of PDEs therefore the problem of classification for partial differential equations is very natural and well known since the classification governs the sufficient number and the type of the conditions in order to determine whether the problem is well posed and has a unique solution.

It is also well known that some of second-order linear partial differential equations can be classified as Parabolic, Hyperbolic or Elliptic however if a PDE has coefficients which are not constant, it is rather a mixed type. In many applications of partial differential equations the coefficients are not constant in fact they are a function

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