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A Study on the Usage of Some Fixed Point Results on Different Space

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Abstract
Special functions are mathematical functions that have a wide range of applications in physics, engineering, and other fields. They are often used to solve partial differential equations (PDEs), which are equations that involve partial derivatives.
There are many different types of special functions, but some of the most common ones include Bessel functions, Legendre polynomials, Hermite polynomials, and Laguerre polynomials. These functions can be used to solve a wide variety of PDEs, including the Laplace equation, the heat equation, and the wave equation.
The special function Laplace equation is a PDE that describes the equilibrium temperature distribution in a homogeneous solid. It is also used to model other physical phenomena, such as the distribution of electric potential and the flow of fluid.

I. Introduction

The special function Laplace equation can be solved using special functions, such as Bessel functions and Legendre polynomials. For example, the solution of the Laplace equation in two dimensions can be written in terms of Bessel functions of the first kind.

A partial differential equation (PDE) is a mathematical equation that describes how a function of several variables changes in space and time. PDEs are used to model a wide variety of physical phenomena, including fluid flow, heat transfer, electromagnetism, and elasticity.

PDEs are more complex than ordinary differential equations (ODEs), which only involve one independent variable. PDEs can be very challenging to solve, but they are also very powerful tools for understanding and predicting the behavior of physical systems.

There are a variety of numerical methods that can be used to solve PDEs. These methods include finite difference methods, finite element methods, and spectral methods.

Finite difference methods divide the domain of the PDE into a grid of points, and then approximate the derivatives in the PDE using finite difference approximations. Finite element methods represent the solution to the PDE as a linear combination of basis functions, and then solve for the coefficients of the basis functions using a variational method.

The term partial differential equation, generally refers to a frequency-dependent phenomenon in its wave propagation. It accounts for the fact that different frequencies in this equation tend to propagate at different phase velocities; and thus, a wave packet of mixed wavelengths tends to spread out in space over time. Dispersive equations are in contrast to transport equations, in which various frequencies travel at the same velocity, or dissipative equations such as the heat equation, in which frequencies do not propagate but instead simply attenuate to vanish.

The special function heat equation describes the diffusion of heat in a material. It is a PDE that is often used to model the cooling of a hot object or the heating of a cold object.

The special function heat equation can be solved using special functions, such as Hermite polynomials and Laguerre polynomials. For example, the solution of the heat equation in one dimension can be written in terms of Hermite polynomials.

The special function wave equation describes the propagation of waves in a medium. It is a PDE that is often used to model the propagation of sound waves, light waves, and seismic waves.

The special function wave equation can be solved using special functions, such as Bessel functions and Legendre polynomials. For example, the solution of the wave equation in one dimension can be written in terms of Bessel functions of the second kind.

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Special functions can also be used to solve other types of PDEs, such as the Schrödinger equation, the Navier-Stokes equations, and the Maxwell equations. They are also used in a variety of other applications, such as statistics, finance, and cryptography.

There are a number of different ways to use special functions to solve PDEs. One common approach is to use the method of separation of variables. This method involves rewriting the PDE as a system of ordinary differential equations, which can then be solved using standard techniques. Special functions are often used to represent the solutions to these ordinary differential equations.

Another approach to using special functions to solve PDEs is to use the method of Green's functions. This method involves constructing a function that satisfies the PDE and has a known set of boundary conditions. Special functions can often be used to construct Green's functions for a variety of different PDEs.

The subject nonlinear partial differential equations, in particular, nonlinear evolution equations of dispersive type is a very active field of research and study in recent times. Here we are going to address some recent developments in this field, viz., the well-posedness and the unique continuation property of the associated Cauchy problem, taking special considerations to some particular models that belong to this class.

As the title suggests itself, we will concentrate our discussion on the dispersive models that belong to the class (1). In what follows we present a detailed account that leads to the definition of the dispersive models.

As indicated by (Olver, P.J. Furthermore, Oskolkov, K.I.), it was demonstrated that the same Talbot impact of dispersive quantization and fractalization shows up all in all periodic linear dispersive equations whose dispersion connection is a various of a polynomial with number coefficients (an "integral polynomial"), the prototypical case being the linearized Korteweg-deVries equation. Subsequently, it was numerically observed, that the effect persists for more general dispersion relations which are asymptotically polynomial: $\omega(k) \sim c\,k^n$ for large wave numbers $k \gg 0$, where $c \in \mathbb{R}$ and $2 \leq n \in \mathbb{N}$. In any case, equations having other huge wave dispersive asvmptotics show a wide assortment of captivating and up 'til now ineffectively comprehended practices, incorporating huge scale oscillations with step by step collecting waviness, dispersive oscillations prompting a slightly fractal wave structure superimposed over a gradually swaying sea, gradually changing voyaging waves, oscillatory waves that interface and in the end get to be fractal, and completely fractal quantized conduct. Up 'til now, aside from the integral polynomially dispersive case, every one of these outcomes depend on numerical perceptions, and, regardless of being basic linear partial differential equations, thorough articulations and verifications have all the earmarks of being extremely troublesome. The concentrate likewise showed some preliminary numerical calculations that firmly demonstrate that the Talbot impact of dispersive quantization and fractalization holds on into the nonlinear administration for both integral and non-integrable development equations whose linear part has an integral polynomial dispersion connection.

The objective of the present study is to proceed with our investigations of the impact of periodicity on harsh starting information for nonlinear advancement equations with regards to two critical illustrations: the nonlinear Schrodinger (nlS) and Korteweg-deVries (KdV) equations, having, individually, rudimentary second and third request monomial dispersion. Our basic numerical tool is the administrator part method, which serves to highlight the transaction between the practices impelled by the linear and nonlinear parts of the equation. Prior thorough results concerning the administrator part method for the Korteweg-deVries, summed up Korteweg-deVries, and nonlinear Schrodinger equations can be found in different studies (Holden, H. also, Lubich, C). We likewise allude the peruser and the references in that for an examination of alternative numerical plans and meeting thereof for L2 introductory information on the genuine line.

II. Conclusion

Since a preparatory adaptation of this study seemed on the web, Erdogan and Tzirakis, have now demonstrated the Talbot impact for the integrable nonlinear Schrodinger equation, demonstrating that at judicious times the arrangement is quantized, while at irra¬tional times it is a continuous, no place separate capacity with fractal profile, in this way affirming our numerical examinations. Thoroughly setting up such observed impacts in the third request Korteweg-deVries equation, and also nonlinear Schrodinger equations with more broad nonlinearities stays open problems.

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