First Order Differential Equation

f ac95455bd3 == Definition == ac95455bd3

Differential equation Such relations are common in mathematical models and scientific laws; therefore, differential equations play a prominent role in many disciplines including engineering, physics, economics, and biology. In applications, the functions In mathematics, a differential equation is an equation that relates one or more unknown functions and their derivatives. In applications, the functions generally represent physical quantities, the derivatives represent their rates of change, and the differential equation defines a relationship between the two. In mathematics, a differential equation is an equation that relates one or more unknown functions and their derivatives ac95455bd3

"without self-reference", as in first-order logic and other logic uses, where it is contrasted with "allowing some self-reference" (higher-order logic) ac95455bd3 (ac95455bd3

Partial differential equation In mathematics, a partial differential equation (PDE) is an equation which involves a multivariable function and one or more of its partial derivatives In mathematics, a partial differential equation (PDE) is an equation which involves a multivariable function and one or more of its partial derivatives ac95455bd3

First-order partial differential equation In mathematics, a first-order partial differential equation is a partial differential equation that involves the first derivatives of an unknown function In mathematics, a first-order partial differential equation is a partial differential equation that involves the first derivatives of an unknown function ac95455bd3

The study of differential equations consists mainly of the study of their solutions (the set of functions that satisfy each equation), and of the properties of their solutions. Only the simplest differential equations are solvable by explicit formulas; however, many properties of solutions of a given differential equation may be determined without computing them exactly. ac95455bd3 Often when a closed-form expression for the solutions is not available, solutions may be approximated numerically using computers, and many numerical methods have been developed to determine solutions with a given degree of accuracy. The theory of dynamical systems analyzes the qualitative aspects of solutions,... ac95455bd3 x ac95455bd3

Homogeneous differential equation A differential equation can be homogeneous in either of two respects. A first order differential equation is said to be homogeneous if it may be written A differential equation can be homogeneous in either of two respects ac95455bd3

A linear differential equation is a differential equation that is defined by a linear polynomial in the unknown function and its derivatives, that is an equation of the form ac95455bd3 Partial differential equations occur very widely in mathematically oriented scientific fields, such as physics and engineering. For instance, they are foundational in the modern scientific understanding of sound, heat, diffusion, electrostatics, electrodynamics, thermodynamics... ac95455bd3

First-order First-order resolution First-order stochastic dominance First order stream Exact first-order ordinary differential equation First-order differential equation In mathematics and other formal sciences, first-order or first order most often means either: ac95455bd3

The function is often thought of as an "unknown" that solves the equation. However, it is often impossible to write down explicit formulas for solutions of partial differential equations. Hence there is a vast amount of modern mathematical and scientific research on methods to numerically approximate solutions of partial differential equations using computers. Partial differential equations also occupy a large sector of pure mathematical research, where the focus is on the qualitative features of solutions of various partial differential equations, such as existence, uniqueness, regularity and stability. Among the many open questions are the existence and smoothness of solutions to the Navier–Stokes equations, named as one of the Millennium Prize Problems in 2000. ac95455bd3 == Initial value problems == ac95455bd3 n ac95455bd3 y ac95455bd3 Given a simply connected and open subset D of ac95455bd3

Exact differential equation mathematics, an exact differential equation or total differential equation is a certain kind of ordinary differential equation which is widely used in In mathematics, an exact differential equation or total differential equation is a certain kind of ordinary differential equation which is widely used in physics and engineering ac95455bd3

a ac95455bd3 is a first-order differential equation plus an initial condition, ac95455bd3 "linear" (a polynomial of degree at most one), as in first-order approximation and other calculus uses, where it is contrasted with "polynomials of higher degree", or ac95455bd3 u ac95455bd3 A first order differential equation is said to be homogeneous if it may be written ac95455bd3

Linear differential equation In mathematics, a linear differential equation is a differential equation that is linear in the unknown function and its derivatives, so it can be written In mathematics, a linear differential equation is a differential equation that is linear in the unknown function and its derivatives, so it can be written in the form ac95455bd3

Ordinary differential equation As with any other DE, its unknown(s) consists of one (or more) function(s) and involves the derivatives of those functions. As with any other In mathematics, an ordinary differential equation (ODE) is a differential equation (DE) dependent on only a single independent variable. In mathematics, an ordinary differential equation (ODE) is a differential equation (DE) dependent

on only a single independent variable. The term "ordinary" is used in contrast with partial differential equations (PDEs) which may be with respect to more than one independent variable, and, less commonly, in contrast with stochastic differential equations (SDEs) where the modeled process is random ac95455bd3

Numerical methods for ordinary differential equations be solved numerically. Their use is also known as "numerical integration", although this term can also refer to the computation of integrals. An Initial value problem (IVP) is a first-order differential equation plus an initial condition, where f {\displaystyle f} is a Numerical methods for ordinary differential equations are methods used to find numerical approximations to the solutions of ordinary differential equations (ODEs) ac95455bd3

Ordinary differential equations occur in many scientific disciplines, including physics, chemistry, biology, and economics. In addition, some numerical methods for partial differential equations convert the partial differential equation into a system of ordinary differential equations, which can then be solved numerically. ac95455bd3 Many differential equations cannot be solved exactly. For practical purposes, however, a numerical approximation to the solution is often sufficient. The algorithms studied here can be used to compute such an approximation. An alternative method is to use techniques from calculus to obtain a series expansion of the solution. ac95455bd3

Hyperbolic partial differential equation mathematics, a hyperbolic partial differential equation of order n {\displaystyle n} is a partial differential equation (PDE) that, roughly speaking, has In mathematics, a hyperbolic partial differential equation of order ac95455bd3

) ac95455bd3 In detail, it may refer to: ac95455bd3 An Initial value problem (IVP) ac95455bd3 , ac95455bd3 == Differential equations == ac95455bd3

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