Free read Handbook of exact solutions for ordinary differential equations (Read Only)

in this article we ll define the conditions for a differential equation to be exact we ll show you how to test equations for their exactness and we ll break down the process of finding the solutions for different types of exact equations 12 years ago the whole premise of the solution is that you have an equation that you can represent as m x n y 0 you define dψ dx m x and dψ dy n y then the above equation becomes dψ dx dψ dy 0 or in other words ψ x y 0 integrate both sides and you end up with ψ x y c 38 votes upvote downvote flag since we obtained this equation by differentiating x2 y2 c the equation is exact we often wish to solve for y in terms of x in our example y c2 x2 an interpretation of the setup is that at each point v m n is a vector in the plane that is a direction and a magnitude in this section we will discuss identifying and solving exact differential equations we will develop of a test that can be used to identify exact differential equations and give a detailed explanation of the solution process we will also do a few more interval of validity problems here as well now theorem pageindex 1 implies that x 4y 3 x 3 2y 3 c onumber is an implicit solution of equation ref eq 3 8 13 solving this for y yields the explicit solution y left c x 3 over2 x 4 right 1 3 onumber solution method 2 the solution to the differential equation is 2x 2y x sin y c onumber does this method always work the answer is no we can tell if the method works by remembering that for a function with continuous partial derivatives the mixed partials are order independent that is f xy f yx onumber example 1 solve 3x 2 y 3 5x 4 dx y 3x 3 y 2 dy 0 in this case we have m x y 3x 2 y 3 5x 4 n x y y 3x 3 y 2 we evaluate the partial derivatives to check for exactness m y 9x 2 y 2 n x 9x 2 y 2 they are the same so our equation is exact we can proceed now we want to discover i x y exact solution as used in physics the term exact generally refers to a solution that captures the entire physics and mathematics of a problem as opposed to one that is approximate perturbative etc exact solutions therefore need not be closed form how to find the solution to an exact differential equation exact differential equations have a specific format and are solved using a specific set of steps in order for a differential equation to be called an exact differential equation it must be given in the form m x y n x y frac dy dx 0 1 theory we consider here the following standard form of ordinary differential equation o d e p x y dx q x y dy 0 p q then the o de is said to be y x exact this means that a function u x y exists such that du u u dx dy x y p dx q dy 0 one solves u u x p and y q to find u x y free exact differential equations calculator solve exact differential equations step by step the handbook of ordinary differential equations exact solutions methods and problems is an exceptional and complete reference for scientists and engineers as it contains over 7 000 ordinary the exact differential equation solution can be in the implicit form f x y which is equal to c although this is a distinct class of differential equations it will share many similarities with first order linear differential equations handbook of exact solutions for ordinary differential equations by valentin f zaitsev andrei d polyanin edition 2nd edition first published 2002 ebook published 27 october 2002 pub location new york imprint chapman and hall crc doi doi org 10 1201 9781420035339 pages 816 ebook isbn 9780429140921 bibliography includes bibliographical references and index contents exact solutions of ordinary

differential equations first order differential equations second order differential equations third order differential equations fourth order differential equations higher order differential equations systems of ordinary differential equations 2 5 exact equations in this section it is convenient to write first order differential equations in the form m x y dx n x y dy 0 2 5 1 this equation can be interpreted as m x y n x y dy dx 0 2 5 2 where x is the independent variable and y is the dependent variable or as exact is the business software market leader in the benelux we are the go to provider for companies looking to automate their accounting financial erp hrm and crm processes we also offer a range of industry specific solutions to fully manage all of your business processes needs more about exact helping businesses grow exact solutions v s perturbative calculations of finite Φ3 Φ4 hybrid matrix model naoyuki kanomata akifumi sako department of mathematics research output contribution to journal article peer review overview fingerprint abstract glassdoor has 3 exact solutions reviews submitted anonymously by exact solutions employees read employee reviews and ratings on glassdoor to decide if exact solutions is right for you 1 introduction solutions of some differential equations can be exactly found using explicit formulas what is a remarkable feature a class of such differential equations is studied in 6 in this paper we present a wider class of odes that are solvable exactly i e its solutions can be found by using formulas

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in this article we ll define the conditions for a differential equation to be exact we ll show you how to test equations for their exactness and we ll break down the process of finding the solutions for different types of exact equations

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12 years ago the whole premise of the solution is that you have an equation that you can represent as m x n y 0 you define dψ dx m x and dψ dy n y then the above equation becomes dψ dx dψ dy 0 or in other words ψ x y 0 integrate both sides and you end up with ψ x y c 38 votes upvote downvote flag

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since we obtained this equation by differentiating x2 y2 c the equation is exact we often wish to solve for y in terms of x in our example y c2 x2 an interpretation of the setup is that at each point v m n is a vector in the plane that is a direction and a magnitude

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in this section we will discuss identifying and solving exact differential equations we will develop of a test that can be used to identify exact differential equations and give a detailed explanation of the solution process we will also do a few more interval of validity problems here as well

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now theorem pageindex 1 implies that x 4y 3 x 3 2y 3 c onumber is an implicit solution of equation ref eq 3 8 13 solving this for y yields the explicit solution y left c x 3 over2 x 4 right 1 3 onumber solution method 2

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the solution to the differential equation is 2x 2y x sin y c onumber does this method always work the answer is no we can tell if the method works by remembering that for a function with

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example 1 solve 3x 2 y 3 5x 4 dx y 3x 3 y 2 dy 0 in this case we have m x y 3x 2 y 3 5x 4 n x y y 3x 3 y 2 we evaluate the partial derivatives to check for exactness m y 9x 2 y 2 n x 9x 2 y 2 they are the same so our equation is exact we can proceed now we want to discover i x y

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how to find the solution to an exact differential equation exact differential equations have a specific format and are solved using a specific set of steps in order for a differential equation to be called an exact differential equation it must be given in the form m x y n x y frac dy dx 0

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1 theory we consider here the following standard form of ordinary differential equation o d e p x y dx q x y dy 0 p q then the o de is said to be y x exact this means that a function u x y exists such that du u u dx dy x y p dx q dy 0 one solves u u x p and y q to find u x y

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the exact differential equation solution can be in the implicit form f x y which is equal to c although this is a distinct class of differential equations it will share many similarities with first order linear differential equations

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2 5 exact equations in this section it is convenient to write first order differential equations in the form m x y dx n x y dy 0 2 5 1 this equation can be interpreted as m x y n x y dy dx 0 2 5 2 where x is the independent variable and y is the dependent variable or as

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1 introduction solutions of some differential equations can be exactly found using explicit formulas what is a remarkable feature a class of such differential equations is studied in 6 in this paper we present a wider class of odes that are solvable exactly i e its solutions can be found by using formulas

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