Approximate analytical solution of the boussinesq equation

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What is approximate analytical solution? An approximate analytical solution is obtained via the variational iteration method. The comparison with Howarth's numerical solution reveals that the proposed method is of high accuracy.

What is an analytical solution of a differential equation? An analytical solution of an ordinary or partial differential equation is a solution given explicitly in terms of known mathematical functions. $T(x,t) = \exp(- \pi^2 t) \sin(\pi x)$, where x is distance and t is time, which satisfies the boundary conditions $T(0,t) = T(1,t) = 0$, and the initial condition $T(x,0) = \sin (\pi x)$.

What are the Boussinesq equations? Boussinesq equations (Boussinesq, 1871, 1872) are a set of nonlinear partial differential equations. Boussinesq equations incorporate frequency dispersion while the shallow water equations are not frequency-dispersive.

What is the Boussinesq equation for groundwater flow? The governing equation for one-dimensional groundwater flow in a horizontal unconfined aquifer can be described by the Boussinesq equation S ? h ? t = K ? ? x h ? h ? x , where is the piezometric head (i.e. the height of the water table measured from the impervious horizontal base of the aquifer), is the horizontal ...

How do you find the approximate solution? Approximating Solutions, also called Trial and Error, or Trial and Improvement, is used for calculating values when an equation cannot be solved using another method. The process involves estimating a start value, deriving the answer from the equation, and then improving the next estimate.

What is analytical approximation? The most important feature of explicit solutions to phase change problems is that they furnish us with a complete picture of how the various parameters of the process under study interact with each other and influence those factors that are of interest to us.

What is an analytical equation? A linear, analytic equation is one for which the coefficient functions are an- alytic and therefore possess convergent power-series expansions, as in equa- tion (4.3) above. The simple conclusion will be that the solutions also pos- sess convergent power-series expansions.

How do you find the analytical solution for PDE?

What is meant by analytical solution? In mathematics, some problems can be solved analytically and numerically. An analytical solution involves framing the problem in a well-understood form and calculating the exact solution. A numerical solution means making guesses at the solution and testing whether the problem is solved well enough to stop.

What is Boussinesq solution? The Boussinesq solution for the distribution of stresses in a half-space resulting from surface loads is largely used in geotechnical and road engineering. It is based on the assumption of a linear–elastic homogeneous isotropic half-space for the soil media.

When to use Boussinesq approximation? The Boussinesq approximation is used to solve buoyancy-driven flows and is less computationally expensive than solving the full compressible formulation of the Navier-Stokes equations.

What is the mathematical formula for Boussinesq's theory? As per Boussinesq's Theory, Boussinesq's Equation for Vertical Stress ?z=KBQz2. Where, KB = Boussinesq's Influence Factor. KB=32?[11+(rz)2]5/2. KB is a number and is a function of the r/z ratio.

What are the limits of the Boussinesq approximation? The Boussinesq limit is characterized two parameters, G = gL 3 ? 2 , and ? = ??, where G is a dimensionless measure of gravitational acceleration or system size and ? is the product of the fluid's coefficient of thermal expansion with a characteristic temperature difference.

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What is the Boussinesq Burgers equation? The Boussinesq equation can be derived by water wave equations [3]. The BBS (1) can be derived by taking a = c = 2 , b = d = ? 1 2 as a special case of the following form [4] of the generalized BBS. u t + a u u x + b v x = 0 , and v t + c (u v) x + d u x x x = 0.

What is the equation for Boussinesq eddy viscosity? This equation is a linear relation between stress and strain tensors, and is analogous to the linear constitutive equation for Newtonian flows: R? = ?2?S, where R? is the viscous stress tensor and ? the viscosity.

What is an approximate equation? The linear approximation formula, as its name suggests, is a function that is used to approximate the value of a function at the nearest values of a fixed value. The linear approximation L(x) of a function f(x) at x = a is, L(x) = f(a) + f '(a) (x - a).

How to do approximate calculation?

What is the difference between exact solution and approximate solution? My understanding is that "exact" translates to "produces a provably optimal solution" and "approximate" translates to "may or may not find an optimal solution but will not provide proof of optimality".

What is the analytical method of estimation? An analytical estimate is defined by the APM as an estimating technique that uses a detailed specification to establish the time and cost of each component.

What are the three types of approximation? We discuss a mixed-integer nonlinear programming formulation for the problem of covering a set of points with a given number of slabs of minimum width, known as the bottleneck variant of the hyperplane clustering problem.

What is the approximation theorem in real analysis? The Weierstrass Approximation Theorem shows that the continuous real- valued fuctions on a compact interval can be uniformly approximated by polynomials. In other words, the polynomials are uniformly dense in C([a, b],R) with respect to the sup-norm.

What does it mean to have an analytical solution? In mathematics, some problems can be solved analytically and numerically. An analytical solution involves framing the problem in a well-understood form and calculating the exact solution. A numerical solution means making guesses at the solution and testing whether the problem is solved well enough to stop.

What is the meaning of approximate solution? : nearly correct or exact : close in value or amount but not precise. an approximate solution.

What is an approximate analysis? Approximate analysis is conducted by making realistic assumptions about the behavior of the structure. Approximate Analysis of Indeterminate Trusses During preliminary design and analysis, the actual member dimensions are not usually known. (because they are designed to be long and slender)

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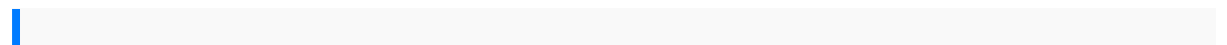
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