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## Patent Search

Invention Title	Computational Analysis of the Consistency for the Navier-Stokes Equation and the Formation of a Uniform Velocity Pr
Publication Number	42/2022
Publication Date	21/10/2022
Publication Type	INA
Application Number	202241058907
Application Filing Date	14/10/2022
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	COMPUTER SCIENCE
Classification (IPC)	G06F0111100000, G06F0030230000, G06F0017130000, G06F0119080000, G06F0030332300

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#### Abstract:

Abstract The boundary solution of a partial differential equation is said to be periodic if it is spatially smooth, satisfies the continuity equation, and the incompressible flow. The initial velocity field in the Navier-Stokes equation must be convergent. Although it is commonly believed that if an initial condition, then the two conditions are congruent, this is not the case. The Navier-Stokes equation's entire compatibility requirement may not be met. The solution is irregular at the outset if the requirement has not been met. Although fluid dynamics research as a whole is aware of the problem, it has not received widespread attention. In this research, we provide a workable computation method for determining if the two systems are compatible. In addition, we also described that fails the seamless initial condition with no spatially smooth approach at the onset of the stream. The analysis and computations are done within a framework. In the absolute lack of wall-normal velocity, the findings for just a channel configuration demonstrate that the constraint is always satisfied for a periodic solution. The condition is often not achieved if the wall-normal acceleration of an object is non-zero, although counter-examples could be constructed using various techniques. To ensure proper beginning conditions for delicate time-dependent numerical simulations, the technique of generating such a field is helpful. It may help you figure out if the selected starting conditions apply or not.

#### Complete Specification

Description: Computational Analysis of the Consistency for the Navier-Stokes Equation and the Formation of a Uniform Velocity Profile in a Channel

#### Field and Background of the Invention

During the previous century, some quantitative proofs were constructed demonstrating the possibility of a smooth Navier-Stokes solution. Ladyzhenskaya's concise summary of the earliest theorems. A mathematical theorem exists in two dimensions for the Navier-Stokes partial differential equation up to two dimensions. However, this has not yet been proven in different dimensions. However, it is acknowledged that perhaps the exceptional solution would occur for intervallic domains. The continuity equation, however, can indeed be completely arbitrary if there is a wall present and the domain is confined in space. As noted briefly in the aforementioned work, and it was subsequently researched extensively. It was shown that if the starting condition satisfies the condition, then the solution is periodic in 3D space at time  $t = 0$ . Following these mathematical findings, he provided a physical justification for them. The calculation leads to an arbitrary reference problem whether the velocity profile is dictated next to the boundary (Dirichlet boundary constraint). Typically, a Neumann pressure is obtained by solving the wall-normal numerical solution. Although, in some cases, the computed pressure can conflict with the tangential distribution. If the incompatibility condition is not met, obtaining a boundary condition by employing the tangential element of the velocity profile is a different pressure field. That would be the case even if the condition were satisfied. The issue was also seen in CFD, as addressed by "How should the condition be handled?" was the key question posed by the writers. Both the Dirichlet as well as the Neumann boundary conditions lead to distinct issues if the condition is not satisfied. It is suggested that the Neumann equation be used at the start. Furthermore, they provide a variety of solutions to the issues that arise.

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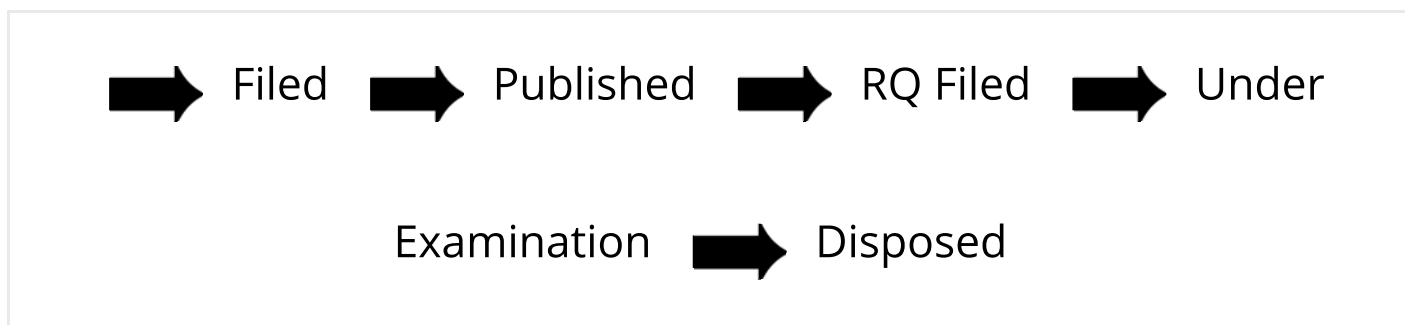
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Application Details	
APPLICATION NUMBER	202241058907
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	14/10/2022
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PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	--
PUBLICATION DATE (U/S 11A)	21/10/2022

Application Status	
APPLICATION STATUS	<b>Awaiting Request for Examination</b>

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