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Introduction

In three space dimensions and time, given an initial velocity field, there exists a vector velocity and a scalar pressure field, which are both smooth and globally defined, that solve the Navier-Stokes equations [1].

Explanation

The Navier Stokes equation:

\[ \rho \left[ \frac{du}{dt} + u \cdot \nabla u \right] = \nabla \cdot \delta + F \]

where \( \rho \) = density
\( \frac{du}{dt} \) = velocity
\( U \) = position
\( \nabla \) = gradient
\( \delta \) = Shear
\( F \) = all other forces

The solution to this equation is the root of the Golden Mean Equation where the variable is \( t \) time explained in Figure 1.

G.M = 1.618

First, let's break down the components as follows.

Density = \( \rho \)

\( \rho = M/\text{Volume} \)

For an ellipsoid with axis \( 1 \times 8 \times 22 \) (or \( 3 \times 24 \times 66 \)) has a volume of 19905 and a Surface area of 1 shown in Figure 2.

Mass \( M = 1/c^4 \)

Strain = \( \sigma/E \)

\( E = 1/0.4233 = 1/(\pi) \)

\( \lim_{t \to 0} (\text{Strain}) = d\Delta/dt \)

\( D = E \cdot \sigma = 1/0.4233 \cdot (P'/A') \)

where \( P \) is constant

\( A' = \text{circumference} = 2\pi R \)

Let \( R = 1/2 \)

\( A = (\pi R^2) = 2\pi (R = \pi) \)

\( \Delta = 1/(0.4233) \cdot P/\pi \)

\( P = (2*4)/(2*4) = 8/3 = 2.667 \)

\( \Delta = 2.022 \)

\( Y = e^{-t} \cdot \cos t = dM/dt \)

**Figure 1:** Ellipsoid with axis \( 1 \times 8 \times 22 \).

**Figure 2:** Illustration of proportionality of strain to sigma.
2.02 = e^(-t) (\sin t)

Solving for t:
\sin t = 2 \text{ radians}
T = 114.59°

Substituting:
E^(-2) (\sin 2) = 1/81 = 1/c^4

Where "c" is a fourth order tensor and is also the gradient or "Del".

Plane ax + by + cz = 0
\sin \theta = c = 2.979293
\sin t = 3
T = 171°

\sin \theta = 0.1411 \text{ rads}
\sin \theta = 3 \text{ radians}
\theta = 171°

\sin 171° = 0.1411 \times 0.858

\sigma = E \text{ strain}
F = \sigma
F = E \text{ strain}
0.858 = 115.5 \times \text{strain}
Strain = 1

Now the Polar Moment of Inertia for the cross section of the ellipsoid is shown in Figure 4:
J = \pi/2 (c^2)^4 - \pi/2 (a^2)^4
J = \pi/2 (13.622)^4 - \pi/2 (2668)

The universe is 13.622 Billion LY across [2]. The Hole in the middle is a=0.2668 Billion LY across.

J = 4672

Now the Shear component, is is given by the equation
\tau_{max} = Tc/J
\tau_{max} = (0.4233)(3)/4672 [MECHANICS OF MATERIALS, BEER ET AL]
= 2.718
= base e

Referring to the original equation, we now have the density, the mass, the gradient, the shear, and t=0. All that remains is the acceleration, velocity, and position shown in Figure 5.

\Delta = P/L/AE [ibid]
\Delta = (dP/dt)(dL/dt)/(dA/dt)(dE/dt)

\frac{dP}{dt} = d(\sin \theta) = -\cos \theta
\frac{dL}{dt} = \text{velocity}
\frac{dA}{dt} = \text{circumference} = 2\pi R
\frac{dE}{dt} = 1 \text{ (Newtonian Fluid)}
\Delta' = \cos \theta/(2\pi (1)^4 \Delta'}
\[
\cos \theta = 2\pi
\]
\[
\theta = 1 \text{ rad}
\]
Substituting these parameters into the original equation:
\[
s[(1)-(1/s)] * c * (1/s) = \text{Tau max}
\]
\[
s^3 - sc - e = (4/3) - 32.718 = 1.615 - 1.618 = \text{G.M.}
\]
\[
= \ln (1/t) = 1.615
\]
where \(Y = 0.2018 = e^{t} \cos 1\) (dampened cosine curve)
\[
T0-t = 1 - 0.9849 = 0.015 = 1/6.66 = 3/2 \text{ (Mass Gap)}
\]
\[
E^{(3/2)} = 4.4824 = \text{Mass}
\]
\[
\ln (1/t) = t
\]
\[
\ln y' = y
\]
So the Navier Stokes is solved by the Golden Mean Parabola [3]
\[
t = 1/(t-1)
\]
Quadratic roots \(t = 1.618\)

**Conclusion**

Thus \(t = \text{Rho}[du/dt + u* del u] - \text{Del} * \sigma - F\)

where \(t^2-t-1 = 0\)

This parabola is smooth.

The Velocity \(du/dt\) is a parabola so its derivative is smooth. The position \(u\) is a scaler. Its derivative is constant.

The Shear Tau max is smooth since it is Torque \(^c/J\). Torque is the force=\(\sin \theta\). Its derivative is smooth. \(C\) is a constant. Its derivative is constant. And the Polar Moment of Inertia \(\pi/2(c2-c1)^4\). Its derivative is smooth.

So the Navier Stokes Equation is smooth.

Volume of Sphere=\(4/3 \pi (2.9978929)^3 = 112.8\)

\(c=2.997929\)

\(\Sigma/E=\text{strain}\)

\(\Sigma/F/\text{Surface Area}\)

\(S.A = 1\)

\(E=1/0.4233 = 1/cuz\)

\(\text{strain} = F/E = 2.667/1/0.4233 = 112.8\)

This means that the forth order tensor, the speed of light, is as smooth as a sphere. That is why the Navier-stokes Equation is smooth.

**References**