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The function for the motion laminar and turbulent in fluids; Navier-Stokes equations

Eulogio Garcia
Institute Polytecnic Leon, (Spain).

Abstract

In this paper I indicate the function $f_{=}(x) \neq 0$ with which is defined in a incompressible fluid (free), the laminar motion and their step to turbulent. $R^n \times [0, \infty]$.

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1. Introduccion

The Navier-Stokes equations are nonlinear and as I indicated, my contribution to the problem is based on a **linear equation** to describe the motion motion and turbulent of incompressible fluids, **and turn will solve the problen of the oneness.** At the end of this work I expose the solution to the equation by Charles Fefferman that they indicated in their article (prize millenium rules) what they is acceptable for millenium prize.

Navier-Stokes equations.

$$\rho\left(\frac{\partial u_i}{\partial t} + u.\nabla u_i\right) = -\frac{\partial p}{\partial x_i} + \upsilon \Delta u_i + f_\epsilon^i$$

$$\nabla.u = 0$$

$$\rho t + u.\nabla\rho = 0$$

2. May Results

Theorem 2.1. The function: $f_=(x) = f_=(y) = f_=(z)$ has the same projection in each and every of its value (x;y;z), whether finite or infinite.

$$f_=(x) = x\left[\sum_1^k e-(e-1)-\left|\frac{-F_{k-n}^k\sqrt{(t,t')}}{-F_{k-n}^k\left(\sqrt{(t'-(2n,n),t_b)}\right)}\right|\right]_{x_j} -$$

$$\left[\sum_1^k e-(e-1)-\left|\frac{-F_{k-n}^k(x_j)\sqrt{(t,t')}}{-F_{k-n}^k\sqrt{t'-_i),(t_b-n_i)}}\right|\right]_{x_j}(x-a)$$

The mathematical formulation of this equation I indicated at end of the article.

In the above equation we have: "(i)" $\sum_1^k e-(e-1)$; defines the number of molecules to be analyzed and the separation between them (parallel) with smooth motion [2], for simplify we have $(a = 1)$. It is also the value "(ii)".
(ii)

$$e-\left|\frac{-F_{k-n}^k\sqrt{(t,t')}}{-F_{k-n}^k\left(\sqrt{(t'-i)),t_b-i)}\right)}\right|$$

The expression (ii) reflects the projective symmetry of turbulence; (F) external force on the molecules (k-n; k) in the point (x_j); (e) all energy by molecule. Also demonstrates the oneness: **an event at the point (x_j) is the same at the point $(x_j + h)$ with the same parameters.**

Projective symmetry is equivalent to the physical law: every body that is raised to a maximun height (crest) reaches back to the starting point. By this reason the crest point is reached at time $[t' = \frac{t_b}{2}]$ and is being proportional to the value (e) and (F); if (t_b) is the duration of the event. Then to $[\frac{t_b}{2} \notin Z]$ we subtract $(i = 1, 3, 5, 7.....)$ and if it is even, we subtract $(i = 2, 4, 6, ...)$ **with this way we obtain the projective symmetry (implies that negative values are not required in the variate)**. The function $(f_=(x))$ says: if there is no one force external on the fluid we will have a laminas (parallel) motion. I refer to the force external as the sole cause of the turbulence, since the viscosity and friction have been analyzed in (e).

Proof 1. If the external force is vertical to the fluid at the point (x_j) we will have the (principle of Archimedes) **ie we have a vortex**[3][4], that deepens in the fluid, for it we applies in $(f_=(x))$ the method "(iii)" at the place of the "(ii)"; with $[i = (1, 3, 5, 7...); (2, 4, 6, 8...)]$; therefore.

(iii)

$$\left|\frac{\dfrac{\mathrm{k}\left(F^{x_j}\sqrt{(t,t')}+1\right)-F^{x_j}\sqrt{(t,t')}}{F^{x_j}\sqrt{(t,t')}+1}}{\dfrac{\mathrm{k}\left(F^{x_j}\sqrt{(t'-n_i,t_b-n_i)}+1\right)-F^{x_j}\sqrt{(t'-n_i,t_b-n_i)}}{F^{x_j}\sqrt{t'-n_i,t_b-n_i}+1}}\right|_{x_j}^{k}$$

$$f_{=}(x)=x\left[\sum_{1}^{k}e-(e-1);\left|\frac{\dfrac{\mathrm{k}\left(F^{x_j}\sqrt{(t,t')}+1\right)-F^{x_j}\sqrt{(t,t')}}{F^{x_j}\sqrt{(t,t')}+1}}{\dfrac{\mathrm{k}\left(F^{x_j}\sqrt{(t'-n_i,t_b-n_i)}+1\right)-F^{x_j}\sqrt{(t'-n_i,t_b-n_i)}}{F^{x_j}\sqrt{t'-n_i,t_b-n_i}+1}}\right|_{x_j}^{k}\right]$$

$$-\left[\sum_{1}^{k}e-(e-1);\left|\frac{\dfrac{\mathrm{k}\left(F^{x_j}\sqrt{(t,t')}+1\right)-F^{x_j}\sqrt{(t,t')}}{F^{x_j}\sqrt{(t,t')}+1}}{\dfrac{\mathrm{k}\left(F^{x_j}\sqrt{(t'-n_i,t_b-n_i)}+1\right)-F^{x_j}\sqrt{(t'-n_i,t_b-n_i)}}{F^{x_j}\sqrt{t'-n_i,t_b-n_i}+1}}\right|_{x_j}^{k}\right](x-a)$$

The vortices have constant angular velocity (ω); if we turn over the axis of symmetry projective will we have by every point of projection perfect circles. In base to this, we define the vorticity in axis of circulars coordinates in the form next. **We project onto the base of a coordinate axis circulares a spiral of radius** $\dfrac{(x_n-x_j)}{2}$**, this radius is the same as will have the vortex in its maximum height.** Now we divide the spiral in equal arcs in the opposite direction to motion clockwise. Below we place each of these values in the variate of the function "(iii)", (this is the same as moving the function "(iii)" by the length of the spiral), we will have the rotational projection of each of the points the coordinate axis; ie the path of the molecules untill maximim height.

$$\left|\frac{\dfrac{\mathrm{a}\left[\sqrt{\pi\,\Delta\left(\frac{r}{2^n}\right)}+1\right]+a\sqrt{\pi\,\Delta\left(\frac{r}{2^n}\right)}}{a\left[\sqrt{\pi\,\Delta\left(\frac{r}{2^n}\right)}+1\right]}}{\dfrac{\mathrm{a}\left[\sqrt{\pi\,\Delta\left(\frac{r_1}{2^{n+1}}\right)}+1\right]+a\sqrt{\pi\,\Delta\left(\frac{r_1}{2^{n+1}}\right)}}{a\left[\sqrt{\pi\,\Delta\left(\frac{r_1}{2^{n+1}}\right)}+1\right]}}\right|$$

The radius (r) is for rotating the first 180°, and (r_1) the following 180°. ($r_1=2r$) and its center is at end of the radius (r). ■

Proof 2. Another possible event: when the force acts on the lower level of the fluid (earthquake); thus we substitute the relation "(iii)" by "(iiii)". In equation we see that for ($e \leq F$) no occurs thrust in the fluid and, if it origicates (Δu) in the molecules in a less than (k) level. When ($F > e$) is produced a push in the fluid and increases the level (k).

(iv)

$$k_n = \frac{k\left[F^{x_j}\sqrt{(t, t'_b)}\right] - (e - F)}{F^{x_j}\sqrt{(t, t'_b)}}$$

3. Conclusion

The equations developed in this paper solve the two problems in fluid mechanics:

1- step of laminar motion to turbulent and once it has passed the turbulence continue laminar motion.

2- an event that happens at a point can be repeated at a later point.

The demonstration of these two points corroborates that it is not possible obtain this same, with the Navier-Stokes equations because the equations are linear.

4. Discussion

I have to say that I share with Charles Fefferman this solution proposed to smooth turbulence in order to approach a laminar motion. We never obtain a laminate with the Navier-Stokes equations, because for it we have the nolinear equation that shown in this paper. But we must recognize that the only way to soften the turbulence to a laminar movement is, omitting the time factor in the speed and in turn, incorporate in the equations constant (C).

Now I analyze the "(8)", "(4)", "(5)" that Charles Fefferman suppoted as solution for the millenium problem.

(8) $u^\circ(x) = u^\circ(x + e_j)$; $f(x, t) = f(x + e_j, t)$ para $1 \leq j \leq n$.

Corolario: This is correct for an accelerated motion, for demonstration we have the function of the speed without the time.

$$f(u) = \frac{\sqrt{ax}}{\sqrt{2}}$$

Therefore start

$$\frac{\sqrt{a.x}}{\sqrt{2}} \neq \frac{\sqrt{a(x+n)}}{\sqrt{2}}$$

this inequality becomes and equality always that.

$$\sqrt{x} + c = \sqrt{x + n}$$

For this, if $(c = 1)$ then $(x = 4^2)$ y $(n = 3^2)$, for any other value of (c) we have, $(c = \sqrt{m^2(x^2+n^2)} - \sqrt{m^2x^2} = m.$ now we can say that the Navier-Stokes equations have acceptable solution; is to say.

$$[u(x,t) + c = u(x+n), t]$$

In the next step I analize the "(4)".

$$\left|\partial_x^\alpha u^\circ(x)\right| \leq C_{\alpha k}(1+|x|)^{-k}; \text{ for any } \alpha \text{ and } k. \tag{4}$$

In this equation we see that the value of (C) is always $C > (1+|x|)^k$ this is not possible for (C = fixed number), unless it is claimed that (C) is the largest of the numbers **it impossible in math.**. But if we admit $C = 4^{xk}$ then it is correct the "(4)".

Navier-Stokes equations have solution if we accept as valid expression $(\sqrt{x}) + c = \sqrt{x+n})$. Assuming as correct this equality, we will not be possible to define the passage of the motion laminar to turbulent and no we can solve the problem of oneness. These problems only be solved with the equations I have stated this paper.

Finally I point the math expressions of my contribution.

$$f_=(x) = xa - a(x-n)$$

(i)

$$\sum_1^k xa - a(x-1)$$

(ii)

$$e - \left| \frac{-b\sqrt{x, x_n}}{-b\sqrt{x_n - i, x_c - i}} \right|$$

(iii)

$$\left| \frac{\dfrac{\mathrm{b}(a\sqrt{x, x_n} + 1) - a\sqrt{x, x_n}}{a\sqrt{x.x_n} + 1}}{\dfrac{\mathrm{b}(a\sqrt{x_n - i.x_c - i} + 1) - a\sqrt{x_n - i, x_c - i}}{a\sqrt{x_n - i, x_c - i} + 1}} \right|$$

(iv)

$$\frac{b\left[a\sqrt{\Delta x - i}\right]_{x_j}^{x_n} - (c-a)}{a\sqrt{\Delta x - i}}; [x > 0; (\Delta x - i = x_j)_{i=1,2,3\ldots}]$$

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