A New Investigation on Resonance of the Sun with a Decisive Importance to Magnetohydrodynamic (MHD) Pure Shear Flow Permeated by an Oblique Magnetic Field

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

MHD Couette motion in a rotating environment under the influence of an inclined magnetic field subjected to a periodic driving force under resonance is investigated. The existence of a magnetic mirror with the Sun is the representation of an inclined magnetic field that exerts its influence of a thermonuclear reactor at the resonant level. Plasma fusion interacts with a controllable region in the presence of an inclined magnetic field so that the emission of hot electron spiralling in a magnetic field. Plasma induced laser radiation in the presence of a magnetic mirror with reference to a driving force with a decisive importance to a dynamo context of the system to exhibit resonance fluorescence so that a laser photon light is transmitted from the sun.

1. INTRODUCTION

Magnetohydrodynamic (MHD) Couette flow is the subject motivated by several important applications of geophysics, astrophysics and fluid engineering. Keeping in view with the technological situation of interest, it finds MHD device like MHD power generator, MHD pumps

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and accelerator, flow meter and nuclear reactor. Recently, magnetohydrodynamic Couette flow of a rotating fluids is a great interest to the researcher by several important problems such as designing of centrifugal machines, the internal rotation rate of the Sun, nuclear reactor, the structure of rotating magnetic stars and the planetary and solar dynamo problems. Hydromagnetic Couette flow in a rotating environment interacts with the Coriolis force to act as a restoring force. The balance between hydromagnetic force and Coriolis force plays an important role to restore the medium which is the source of sustainable energy. Taking into account these facts, unsteady hydromagnetic Couette flow of a viscous incompressible electrically conducting fluid in a rotating system is investigated by Greenspan [1], Zierap and Buhler [2], Mandal et al. [3], Mandal and Mandal [4], Steinheur [5], Singh [6], Singh and Sharma [7], Seth et al. [8], Chandran et al. [9], Hayat et al. [10] and Das et al. [11] to analyse the various aspect of the problem. All these authors have considered transversed magnetic field. Recently, Ghosh [12] analysed the effect of Hall current on MHD Couette flow in a rotating system with arbitrary magnetic field whereas Guria et al. [13] considered oscillatory MHD Couette flow in a rotating system in the presence of an inclined magnetic field. Although steady MHD Couette flow in a rotating system in the presence of an inclined magnetic field with induced magnetic field effect has been studied by Seth et al. [14]. The effect of Hall current on MHD Couette flow in a rotating system was studied by Ghosh and Pop [15], Hayat et al. [16] and Seth et al. [17]. Nevertheless, oscillatory MHD Couette flow in a rotating highly permeable medium permeated by an oblique magnetic field was studied by Beg et al. [18]. However, Ghosh [19] was first investigated that the Sun is a thermonuclear reactor.

MHD plasma Couette flow is a challenging approach to plasma science pose formidable mathematical challenge due to a driving force in the presence of an inclined magnetic field. In relating to the physical situation of interest, it is stated that the Sun is a thermonuclear reactor with a view to analyze controlled thermonuclear fusion reaction at the resonance level in the presence of an inclined magnetic field so that excitation frequency leads to a dynamo context of the Sun. A magnetic mirror shows its influence of an inclined magnetic field so that magnetic field grows towards the resonance level where excitation frequency becomes predominant. It is

noticed that the thermonuclear reaction becomes stop if the excitation frequency is switched off. Although plasma fusion is subjected to hot electrons in a controllable region spiralling in a magnetic field under resonance permeated by an inclined magnetic field so that excitation frequency becomes significant. In this situation, plasma fusion takes place of a driving force with reference to radio emission to exhibit artificial rain fall. This leads to a start up flow subject to a frictional layer suddenly sets into motion in the presence of a radiofrequency accelerator. X-emission is produced in a Vacuum at resonance by increasing radiofrequency voltage. Resonance corresponds to a physical system which is acted by an external periodic driving force in which the resulting amplitude of the oscillation of the system becomes large when the frequency of the driving force (excitation frequency) approaches a natural frequency of oscillation of the system. A maximum dissipation of energy is liberated from the Sun with large amplitude when the kinetic energy is transformed into heat. Since frictional layer suddenly sets into motion in the presence of a radiofrequency accelerator, the Sun lies in a vacuum as the air brocks down and the start-up flow communicate solar wind in the presence of resonance. An oscillator emerges the back bone of a driving force in the presence of an inclined magnetic field exerts its influence of a plasma induced laser radiation so that the system rotates with angular frequency with the growing of a magnetic field towards the resonant level and the angular frequency corresponds to a phase angle subject to a periodic driving force. In this context, the magnetic field increases in strength abruptly in the presence of an inclined magnetic field and the reflection occurs with an abrupt increase in magnetic field to exhibit resonance fluorescence when the phase angle is $\pi/2$. It reveals that a laser photon light is transmitted from the Sun. Indeed, a strong ionizing radiation in the atmosphere under the influence of an inclined magnetic field communicates from the Sun. Nevertheless, resonance of the Sun leads to a plasma fusion due to a driving force to expedite dynamo mechanism in concurrence with symmetric chaos subject to a excitation frequency. The differential rotation of the sun due to a driving force is an emergent literature of a cyclonic turbulence at the resonant level so that the liberation of hot electrons from the Sun in the presence of an excitation frequency determines solar storm and the magnetic field oscillates in a vacuum. This situation reveals that the liberation of a charged particle from the Sun takes place in

a strong magnetic field due to increase in differential rotation of the Sun so that magnetic field line changes in a hapazard direction abruply from the central region of the Sun. Indeed, the sun is an MHD with the new occurrence of an electromagnetic field under Maxwell equations.

Controlled Thermonuclear fusion reaction of the Sun at the resonant level in the presence of a radiofrequency accelerator exerts in influence of artificial rain fall so that hot electrons is liberated from the Sun permeated by a magnetic field to determine radio emission and plasma fusion takes place of a controllable region in which the hot electron is spiralling in a magnetic field. In this regard, thermonuclear fusion reaction takes place into a fusion reactor to begin artificial rainfall which occurs from the Sun. In turn, electrical discharge from the solar corona attains maximum strength with a radiofrequency accelerator subjected to lightning to fall on the earth due to radiofrequency burst in the atmosphere with a high voltage that affects the society around the world. Indeed, a controlled thermonuclear fusion reaction of the Sun in the presence of a radiofrequency accelerator is in agreement with $E >> mc^2$ where E is the energy, m is the mass and C is the velocity of light so that energy label is very high which breaks down Einstein relation $E = mc^2$. On the other hand, a dynamo mechanism of the Sun at the resonant level reveals to a symmetric Chao due to balance of a magnetic field which proves resonance with the Sun. Artificial rain fall takes place in a controlled thermonuclear fusion reaction of the Sun permeated by a radiofrequency accelerator in the presence of a magnetic mirror subjected to an inclined magnetic field at the resonant level to determine laser rainbow in a oscillating charge particle with an oscilloscope which is visible in the sky. The liberation of hot electron from the Sun under the influence of a radiofrequency accelerator is the occurrence of cyclone so that gravitational acceleration gives rise to a oceanic circulation to show depression on the ocean belt with the swollen of sea water due to radio wave and the magnetic field changes its direction abruptly from the central axis of the Sun which is an appropriate literature on solar storm.

In this context, a controlled thermonuclear fusion reaction of the Sun in the presence of a radiofrequency accelerator calls artificial rainfall to the moon to accelerate the flood of water until fusion reaction takes place due to average gravity of the moon and the sun. It is convenient to cast that the spiral radio galaxy is inspired by the Sun due to the occurrence of radio emission with the Sun which indicates emission of hottest electron moves inside the spiral radio galaxy that comes into true for plasma universe what is called white dwarf plasma. Although ionized hydrogen in a fusion reactor to transform into the abundance of helium with the Sun takes place of a supernova explosion into the Sun to become a neutron star. In a controllable region in the presence of an inclined magnetic field at the resonant level determines in a realistic situation of the universe to balance magnetic field inside the Sun in order to avoid supernova explosion with the Sun subjected to plasma universe. A controlled thermonuclear fusion of the Sun leads to a microwave background of radiation in which a high frequency telecommunication satellite in a radiofrequency field with the Earth atmosphere so that a radio wave is propagated from the sun at the resonant level. In this situation, ultraviolet radiation in the Earth atmosphere subject to $E >> mc^2$ is visible from the Sun to the Earth. However, radio emission is a synchrotron radiation; a radio frequency wave is propagated from the Sun via Earth observation satellite to become an adverse situation of human activity around the world with different pulse code unit of human characteristics. It is worth mentioning that the Earth observation Satellite moves in the atmosphere from one place to another in connection with the Sun in a vacuum. A relay circuit introduces inside Earth observation satellite creates high voltage current flow with regard to $\nabla.J \neq 0$ where J is the current density in the presence of a displacement current which takes place of a conservation of electric charge under the synchronization of a relay circuit.

Author calls for the attention to the readers that air crash all over the world takes place of X-emission to raise radiofrequency wave via radio emission at the resonant level so that hot electrons is liberated like a storm and a fire of storm comes into true with a high voltage to transform into X-emission with a bright blue flash. This happening around the world exert its influence of television circuit work. This terrible evidence is true by an experiment with radiofrequency X-ray machine in a vacuum when author was in a hospital at the age of 12.

2. FORMULATION OF THE PROBLEM AND ITS SOLUTIONS

The transient hydromagnetic (MHD) start up flow of a viscous incompressible fluid that conducts electricity confined between parallel plates

spaced 'd' apart, rotating with a uniform angular velocity Ω about an axis perpendicular to their planes in the existence of an inclined magnetic field with the favourable direction of the axis of rotation with reference to a forced oscillation permeated by an oscillator, is investigated. To select a cartesian coordinate system so that the upper plate is fixed and moves with a uniform velocity U relative to the rotating frame of reference, with the y-axis perpendicular to the lower plate and the x- and z-axes resting on the lower plate. Since the plates are infinite along x and z direction, all physical quantities will be functions of y and τ only.

The following justifications are compatible with the fundamental equations of magneto-hydrodynamics

$$q = (u', 0, w'); B = \left(B_x' + B_0 Sin\theta, B_0 Cos\theta, B_z'\right)$$

$$E = (E_x, E_y, E_z); J = (J_x, J_y, J_z) \tag{1}$$

Where q , B , E and J are respectively the velocity vector, magnetic field vector, electric field vector and the current density vector.

The MHD momentum equation in a rotating frame of reference reads

$$\frac{\partial q}{\partial t} + (q.\nabla)q + 2\Omega\hat{k}\text{x}q = \nu\nabla^2 q + \frac{1}{\rho} J \text{ x } B \tag{2}$$

The equation of continuity becomes

$$\nabla.q = 0 \tag{3}$$

The Ohm's law for a moving conductor

$$J = \sigma [E + q \text{ x } B] \tag{4}$$

The Maxwell's equations are

∇ x B = μ_eJ,
∇ x E = - $\frac{\partial B}{\partial t}$
∇ . B = 0
∇ . J $\neq$ 0

where,

σ, υ, ρ, μ_e , Ω and $\hat{k}$ are, respectively, the electrical conductivity, kinematic coefficient of viscosity, fluid density, magnetic permeability, angular velocity and a unit-vector along y-axis. B_0 is the magnetic flux density and θ is the angle of inclination of a

magnetic field with the positive direction of the axis of rotation.

The applied magnetic field is typically distorted by the electric current that is passing through the fluid. It is acceptable to disregard the induced magnetic field as contrasted to the applied one because the frictional layer at the boundary is suddenly pushed into motion to produce thermally ionised air, which is the best of poor electrical conductors. Thus the magnetic field vector can be taken as B=($B_0 Sin\theta$, $B_0 Cos\theta$, 0). Since no external electric field is applied, the polarization voltage is negligible. Therefore, it is reasonably assumed as E = 0.

Under the justification (1) the MHD momentum equations in a rotating frame of reference subject to a component form together with the Ohm's law for a moving conductor (4) in relation with the Maxwell's equations(5) can be written in the following form

$$\frac{\partial u'}{\partial t} + 2\Omega w' = \upsilon\frac{\partial^2 u'}{\partial y^2} - \frac{\sigma B_0{}^2}{\rho}u' Cos^2\theta \tag{6}$$

$$\frac{\partial w'}{\partial t} - 2\Omega u' = \upsilon\frac{\partial^2 w'}{\partial y^2} - \frac{\sigma B_0{}^2}{\rho}w' \tag{7}$$

The boundary conditions are

$u' = w' = 0$ for t $\leq$ 0, 0 $\leq$ y $\leq$ d,

$u' = w' = 0$ at y = 0, t > 0, $\tag{8}$

$u' = U, w' = 0$ at y = d, t > 0.

Equations (6) and (7) can be written in a dimensionless form such as

$$\frac{\partial^2 u}{\partial \eta^2} - \frac{\partial u}{\partial \tau} - M^2 u Cos^2\theta = 2K^2w, \tag{9}$$

$$\frac{\partial^2 w}{\partial \eta^2} - \frac{\partial w}{\partial \tau} - M^2 w = -2K^2u, \tag{10}$$

Where $\eta = \frac{y}{d}$, u = $\frac{u'}{U}$, w = $\frac{w'}{U}$, t = $\frac{d^2\tau}{\upsilon}$,

M = B_0L $(\sigma/\rho\upsilon)^{1/2}$ is the Hartmann number and $\tag{11}$

$K^2 = \frac{\Omega d^2}{\upsilon}$ is the rotation parameter which is the reciprocal of Ekman number.

The corresponding boundary conditions are

u = w = 0, for $\tau \le 0$ and $0 \le \eta \le 1$,

u = 0, w = 0 at η = 0, τ > 0   (12)

u = F(τ), w = 0 at η = 1, τ > 0

Since forced oscillation is taken into account, it is reasonably assumed

$u(\eta,\tau) = u_0(\eta)\, Cos\omega\tau$ (13)

$w(\eta,\tau) = w_0(\eta)\, Cos\omega\tau$

The corresponding boundary conditions

u = 0, w = 0 at η=0, τ > 0   (14)

u = $Cos\omega\tau$, w = 0 at η = 1, τ > 0

Equations (9) and (10) are in agreement with $\nabla.J \ne 0$ subject to J = (J_x, J_y, J_z). This study leads to a displacement current effect due to an external periodic driving force subject to a forced oscillation in the presence of an inclined magnetic field with regard to $\nabla.J \ne 0$. When a displacement current is taken into account, it is possible to consider even those situations which involve non-steady current i.e. situation where $\nabla.J \ne 0$. A.C circuit furnish a special case of time varying electromagnetic phenomenon, where all the variations are sinusoidal in character. The action of such circuits with capacitors as circuit elements can be understood on the basis of the displacement current. Indeed, in a time varying electromagnetic field of sinusoidal in nature subject to $\nabla.J \ne 0$, an inclined magnetic field is the representation of a traveling magnetic field.

Using (13), the equations (9) and (10) can be solved subject to the boundary conditions (14) and solutions for the velocity distributions can be written in the following form.

$$u(\eta,\tau) = \left[\frac{M^2 Sin^2\theta + iG^2}{2iG^2}\frac{Sinh(\alpha-i\beta)\eta}{Sinh(\alpha-i\beta)} - \frac{M^2 Sin^2\theta - iG^2}{2iG^2}\frac{Sinh(\alpha+i\beta)\eta}{Sinh(\alpha+i\beta)}\right] Cos\omega\tau,$$ (15)

$$w(\eta,\tau) = \frac{M^4 Sin^4\theta + G^4}{8iK^2 G^2}\left[\frac{Sinh(\alpha-i\beta)\eta}{Sinh(\alpha-i\beta)} - \frac{Sinh(\alpha+i\beta)\eta}{Sinh(\alpha+i\beta)}\right] Cos\omega\tau,$$ (16)

where

$$\alpha,\beta = \frac{1}{2}\left\{[\{(1+Cos^2\theta)M^2 - 2\omega\, tan\omega\tau\}^2 + G^4]^{1/2} \pm \{(1+Cos^2\theta)M^2 - 2\omega\, tan\omega\tau\}\right\}^{1/2}$$ (17)

and

$$G^2 = (16K^4 - M^4 Sin^4\theta - 4\omega^2 tan^2\omega\tau - 4\omega^2)^{1/2}$$ (18)

Expressions (17) and (18) are in agreement with Ghosh [15].

The condition(18) can be expressed in the following form

$$(16K^4 - M^4 Sin^4\theta - 4\omega^2 tan^2\omega\tau - 4\omega^2) \begin{matrix} > \\ = \\ < \end{matrix} 0 \text{ according as } G^4 \begin{matrix} > \\ = \\ < \end{matrix} 0.$$

There arises three conditions in such a way that

$\omega > \frac{1}{2}\,Cos\,\omega\tau\,(16K^4 - M^4 Sin^4\theta)^{1/2}$, $\omega < \frac{1}{2}\,Cos\,\omega\tau\,(16K^4 - M^4 Sin^4\theta)^{1/2}$ and $\omega = \frac{1}{2}\,Cos\,\omega\tau\,(16K^4 - M4Sin4\theta1/2$

In relevance to the condition $\omega > \frac{1}{2}\,Cos\omega\tau\,(16K^4 - M^4 Sin^4\theta)^{1/2}$ it is stated that a resonant response occurs with reference to a driving force with a decisive importance to the phase angle $\omega\tau=\pi/2$ to prove resonance when the excitation frequency ω > 0. Therefore, phase angle rotates with angular frequency of oscillation to build up a rapid oscillation of a charged particle and its amplification is very high when $\omega\tau = \pi/2$. In this situation, magnetic field grows towards the resonance level so that reflection occurs due to the presence of a magnetic mirror as the magnetic field increases in strength

abruptly. This indicates that laser radiation is so intense due to the presence of a magnetic mirror at the resonant level. A radiofrequency accelarator with the Sun in the presence of a magnetic mirror leads to a controlled thermonuclear fusion reaction to produce plasma induced laser radiation due to a driving force subject to an oscillator at the resonant level to prove resonance fluorescence when $\omega\tau$= π/2 and a radio wave propagation from the Sun is visible in the sky (See image of a solar activity in the year of 2006).

In a realistic scenario, the Sun and a radiofrequency accelerator push the frictional layer at the boundary into motion, causing space pressure to drop significantly below atmospheric pressure as the air dissipates. In such a scenario, the Sun is exposed to a vacuum and releases X-rays. In order to determine radio emission, heated electrons spinning in a magnetic field emit synchroton radiation from the Sun in a vacuum. An angled magnetic field is represented by the Sun and a magnetic mirror. To combat plasma-induced laser radiation at the resonance level, a potent ionising radiation is produced inside the solar environment. In compliance with the condition, $\omega < \frac{1}{2} Cos\,\omega\tau\,(16K^4 - M^4 Sin^4\theta)^{1/2}$ it is rigorously stated that no resonant response occurs when the phase angle $\omega\tau$= π/2 in accordance with the excitation frequency $\omega < 0$.

As referred to a condition $\omega = \frac{1}{2} Cos\,\omega\tau\,(16K^4 - M^4 Sin^4\theta)^{1/2}$ there arise stagnation when the phase angle $\omega\tau$= π/2 is compatible with the excitation frequency $\omega = 0$. Since phase angle rotates with angular frequency of oscillation, there exists a stagnation so that the velocity will be zero if the excitation frequency is switched off. On the other hand, in the absence of phase angle i.e. $\omega\tau = 0$, the condition leads to an inertial frequency $\omega = \frac{1}{2}(16K^4 - M^4 Sin^4\theta)^{1/2}$ in a rotating environment. This justification comes to a conclusion that the Sun is an activation of resonance in the presence of a driving force subject to the resonant condition $\omega > \frac{1}{2} Cos\,\omega\tau\,(16K^4 - M^4 Sin^4\theta)^{1/2}$.

The solutions (15) and (16) together with (17) and (18) turn into the general form of a transient MHD start up flow in the presence of an inclined magnetic field if the phase angle is absent ($\omega\tau$=0) and the solutions (15) and (16) reduce to

$$u(\eta,\tau) = \left[\frac{M^2 Sin^2\theta + iG^2}{2iG^2}\frac{Sinh(\alpha-i\beta)\eta}{Sinh(\alpha-i\beta)} - \frac{M^2 Sin^2\theta - iG^2}{2iG^2}\frac{Sinh(\alpha+i\beta)\eta}{Sinh(\alpha+i\beta)}\right] \tag{19}$$

$$w(\eta,\tau) = \frac{M^4 Sin^4\theta + G^4}{8iK^2G^2}\left[\frac{Sinh(\alpha-i\beta)\eta}{Sinh(\alpha-i\beta)} - \frac{Sinh(\alpha+i\beta)\eta}{Sinh(\alpha+i\beta)}\right] \tag{20}$$

where

$$\alpha,\beta = \frac{1}{2}\left[\{(1+Cos^2\theta)^2 M^4 + G^4\}^{1/2} \pm (1+Cos^2\theta)M^2\right]^{1/2} \tag{21}$$

and

$$G^2 = (16K^4 - M^4 Sin^4\theta - 4\omega^2)^{1/2} \tag{22}$$

Since phase angle rotates with angular frequency of oscillation, the absence of phase angle comes to a justification in two ways viz, $\omega > \frac{1}{2}(16K^4 - M^4 Sin^4\theta)^{1/2}$ and $\omega < \frac{1}{2}(16K^4 - M^4 Sin^4\theta)^{1/2}$. The former condition leads to a resonant response with reference to a dynamo mechanism of the system. The later is valid with the maintenance of a magnetic field and the resonant response do not occur. The inertial frequency of a rorating environment does exist when $\omega = \frac{1}{2}(16K^4 - M^4 Sin^4\theta)^{1/2}$.

In taken into account of the solutions (15) and (16) together with (17) and (18) it is stated that since the system rotates with phase angle; if the excitation frequency ω is switched off then then phase angle $\omega\tau$ is zero and the solutions reduce to a steady state MHD flow in a rotating environment subject to $u(\eta)$ and $w(\eta)$ for (19) and (20) where

$$\alpha, \beta = \frac{1}{2}\left[\{(1+Cos^2\theta)^2 M^4 + G^4\}^{1/2} \pm (1+Cos^2\theta)M^2\right]^{1/2}$$

and

$$G^2 = (16K^4 - M^4 Sin^4\theta)^{1/2} \tag{23}$$

The condition (23) represents a dynamo context of a rotating environment.

3. Shear stress at the moving plate $\eta=1$

$$\frac{du}{d\eta}\Big|_{\eta=1} = \left[\frac{M^2 Sin^2\theta + iG^2}{2iG^2}\frac{(\alpha-i\beta)\,Cosh(\alpha-i\beta)}{Sinh(\alpha-i\beta)} - \frac{M^2 Sin^2\theta - iG^2}{2iG^2}\frac{(\alpha+i\beta)\,Cosh(\alpha+i\beta)}{Sinh(\alpha+i\beta)}\right]Cos\ \omega\tau, \tag{24}$$

$$\frac{dw}{d\eta}\Big|_{\eta=1} = \frac{M^4 Sin^4\theta + G^4}{8iK^2 G^2}\left[\frac{(\alpha-i\beta)\,Cosh(\alpha-i\beta)}{Sinh(\alpha-i\beta)} - \frac{(\alpha+i\beta)\,Cosh(\alpha+i\beta)}{Sinh(\alpha+i\beta)}\right]Cos\ \omega\tau \tag{25}$$

Table 1. Frictional shear stress at the moving boundary for K^2=5, ω = 0.2 and $\omega\tau$ =0 due to main flow direction (u)

θ \ M^2	10	12	14	16	18
0	3.48092	3.72052	3.95283	4.17731	4.39396
π/6	3.13413	3.32258	3.50862	3.69093	3.86880
π/4	2.75359	2.88036	3.00984	3.14014	3.26997
π/3	2.32825	2.37645	2.43167	2.49213	2.55639
π/2	1.84083	1.77992	1.72484	1.67471	1.62881

Table 2. Frictional shear stress at the moving boundary for K^2=5, $\theta=\pi$/4 and ω=0.2 due to main flow direction (u)

$\omega\tau$ \ M^2	10	12	14	16	18
0	2.75359	2.88036	3.00984	3.14014	3.26997
π/6	2.36981	2.47957	2.59181	2.70483	2.81751
π/4	1.92561	2.01520	2.10688	2.19926	2.29139
π/3	1.34990	1.41319	1.47806	1.54350	1.60879

Table 3. Frictional shear stress at the moving boundary for K^2=5, ω=0.2 and $\omega\tau$=0 due to cross flow direction (w)

θ \ M^2	10	12	14	16	18
0	-1.44135	-1.34654	-1.26628	-1.19759	-1.13816
π/6	-1.51182	-1.41843	-1.33823	-1.26878	-1.20814
π/4	-1.59681	-1.50722	-1.42879	-1.35979	-1.29872
π/3	-1.70268	-1.62177	-1.54924	-1.48399	-1.42509
π/2	-1.84046	-1.77956	-1.72449	-1.67437	-1.62848

Table 4. Frictional shear stress at the moving boundary for K^2=5, $\theta=\pi$/4, ω=0.2 due to cross flow direction (w)

$\omega\tau$ \ M^2	10	12	14	16	18
0	-1.59681	-1.50772	-1.42879	-1.35979	-1.29872
π/6	-1.38911	-1.31071	-1.24210	-1.18176	-1.12838
π/4	-1.13757	-1.07308	-1.01667	-0.96706	-0.92320
π/3	-1.80819	-0.76202	-0.72165	-0.68617	-0.65481

3. RESULTS AND DISCUSSION

To examine the start up flow characteristics with various values of M², θ, ωτ and ω, it lies in its physical approach with reference to the graphical representations in Figs 1 to 4. Fig. 1 shows that the flow of main flow (u) and cross flow (w) the flow velocity increases with the increase in angle of inclination (θ). This happens in the case of an electromagnetic field to distort the magnetic lines of force owing to the presence of Lorentz force. In this case, Lorentz force accelerates the velocity field in the range 0≤θ≤π/₂ subject to the angle of inclination of a magnetic field. This indicates its behaviour of a magnetic field subject to ∇.J≠0 at resonance. The angle of inclination of a magnetic field have a pronounced effect on angular frequency so that flow velocity increases with the increase in θ when θ = π/₂ with the resonance in compliance with the excitation frequency ω>0 . Fig. 2 communicates that the flow velocity increases in the main flow (u) with the increase in magnetic force (M²) whereas the flow velocity due to cross flow (w) decreases with increase in magnetic force (M²). This phenomenon has received in a time varying electromagnetic field where magnetic field grows in the main flow while there arises destabilizing influence on the cross flow (w) which leads to fall the velocity. It is noticed that in a controllable region at the resonant level

when θ = π/₂ , the magnetic pumping becomes significant when the excitation frequency ω>0. A charged oscillator takes place of an oscillating current flow due to a periodic driving force; an A.C. circuit furnishes for non-steady current flow subject to ∇.J≠0 in a time varying electromagnetic field under electrical relay analogy. Fig. 3 reveal that the flow velocities due to main flow (u) and cross flow (w) decrease with an increase in phase angle (ωτ). Since a start up flow accelerates the flow field in the presence of an oscillator, the velocity field due to main flow (u) and cross flow (w) in the presence of a driving force leads to a reducible influence on the flow field. In taking into account of fact that since forcing wave excites natural frequency, the phase angle ωτ=π/₂ is compatible with the excitation frequency ω>0. In this situation, the angular frequency ω rotates with phase angle, the time varying electromagnetic field communicates resonance leading to a dynamo context of Sun so that the hydromagnetic force and Coriolis force are comparable in magnitude. Thus, a synchronized laser photon light is transmitted from the Sun with the propagation of radio wave at shorter wave length. A radio signal from the Sun comes to the Earth atmosphere with strong ionizing radiation in the atmosphere with a decisive importance to an inclined magnetic field with the Sun.
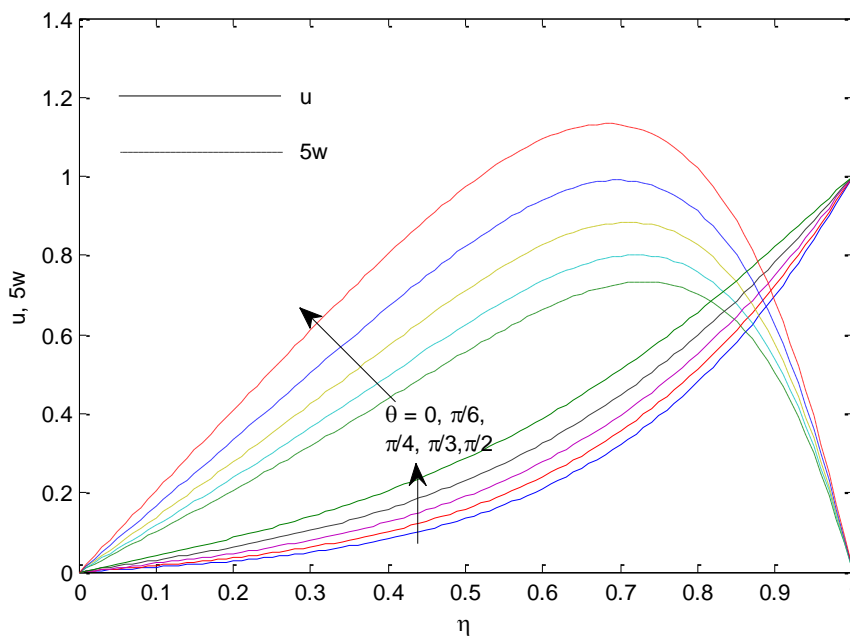

Fig. 1. u and w for different values of $\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}$ and $\frac{\pi}{2}$ with $M^2 = 10, K^2 = 5, \omega = 0.2$ and $\omega\tau = 0$
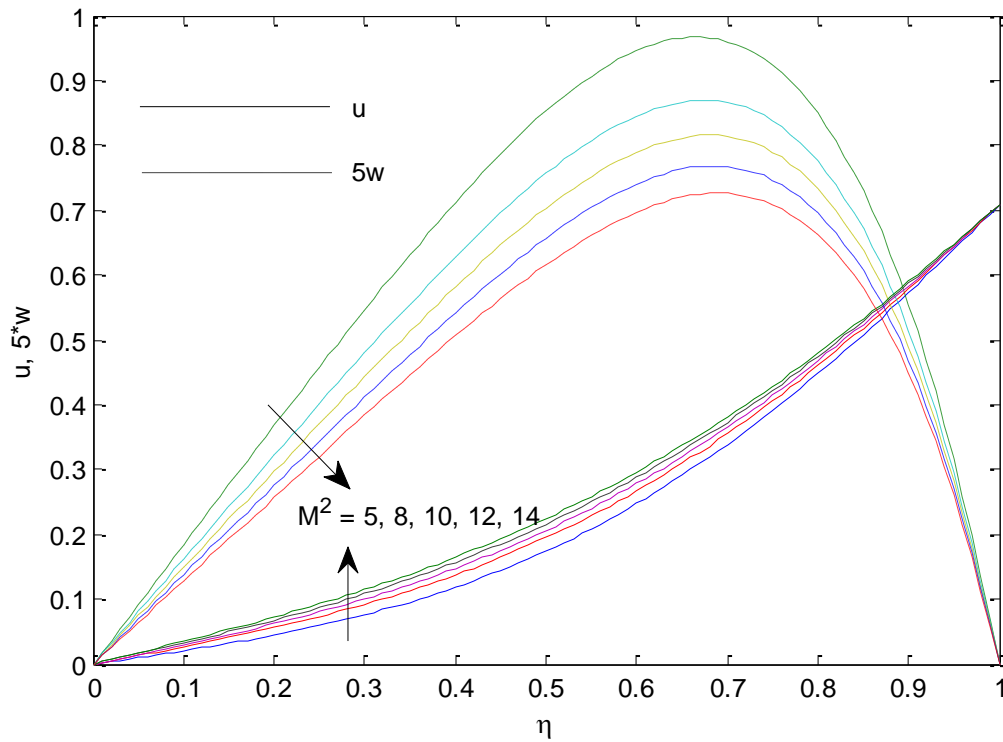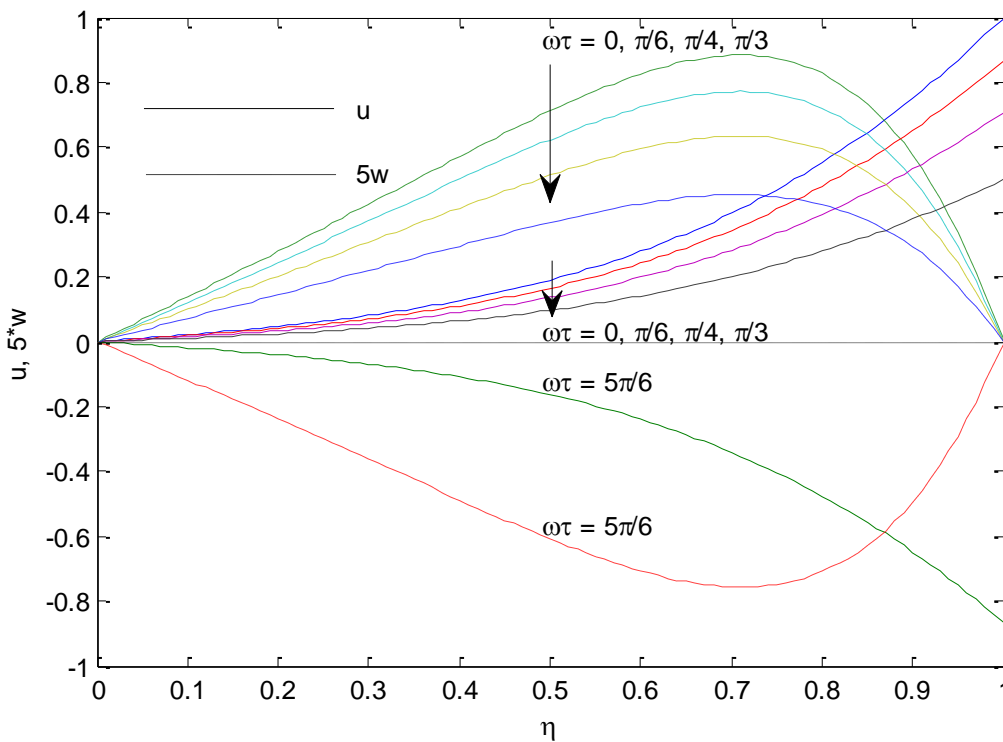
Fig. 2. u **and** w **for different values of** $M^2 = 5, 8, 10, 12$ **and** 14 **with** $K^2 = 5, \omega = 0.2, \omega\tau = \frac{\pi}{4}$ **and** $\theta = \frac{\pi}{2}$

Fig. 3. u **and** w **for different values of** $\omega\tau = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}$ **and** $\frac{5\pi}{6}$ **with** $M^2 = 10, K^2 = 5, \omega = 0.2$ **and** $\theta = \frac{\pi}{4}$
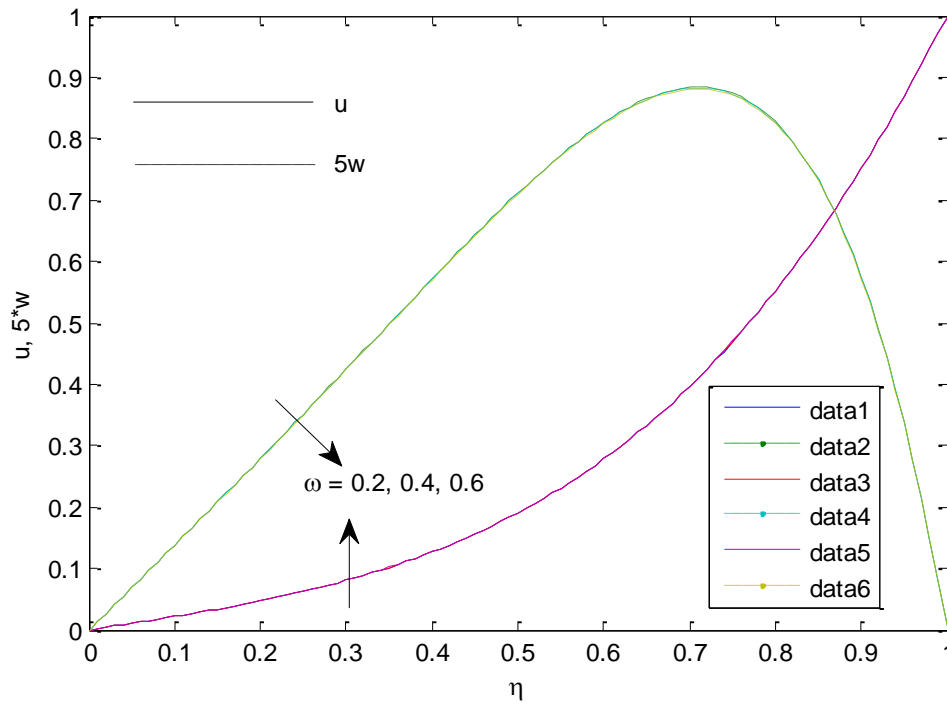
Fig. 4. u **and** w **for different values of** $\omega = 0.2, 0.4$ **and** 0.6 **with** $M^2 = 10, K^2 = 5, \omega\tau = 0$ **and** $\theta = \frac{\pi}{4}$
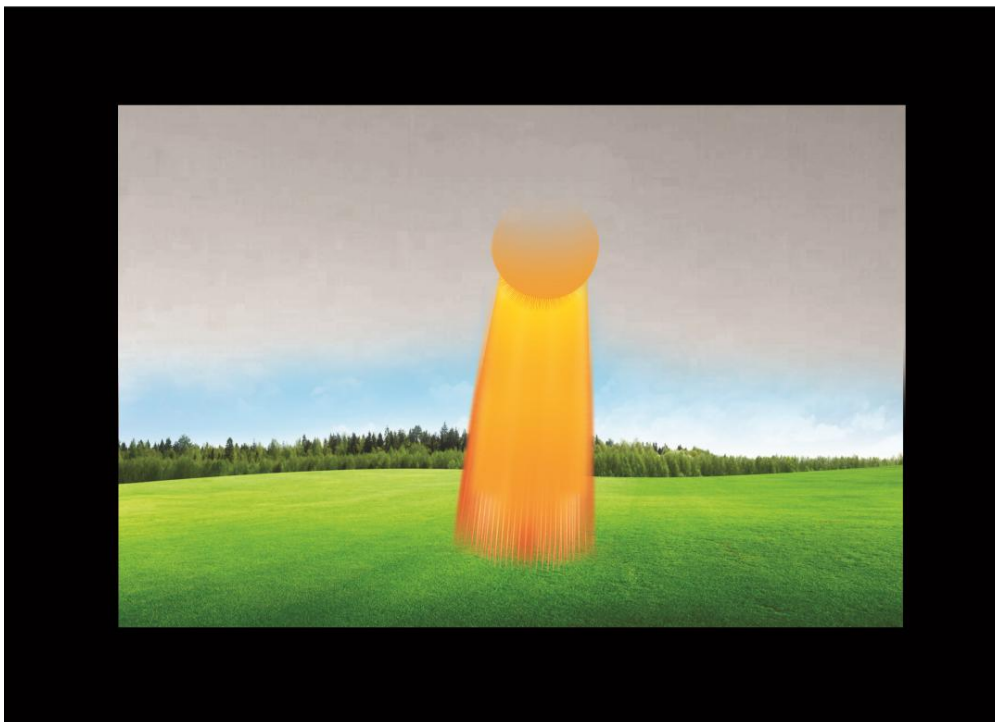

Fig. 5. Plasma induced laser radiation shows resonance fluorescence to prove synchronized photon light in the presence of the radio frequency accelerator under the influence of a magnetic mirror with reference to an oscillator in the context of dynamo mechanism of Sun. Such a behaviour of the Sun was visible in the shy with radio wave probation in the year of 5th November, 2006

Fig. 4 demonstrates that the flow velocity due to main flow (u) increases with an increase in excitation frequency (ω) while the flow velocity due to cross flow (w) decreases with an increase in excitation frequency (ω). In connection with the physical system it is stated that the MHD start up flow exerted by the excitation frequency (ω) to increase the velocity in the main flow field to enhance radio frequency voltage in the presence of a magnetic field in a vacuum. On the other hand, the flow velocity due to cross flow (ω) decreases due to the presence of an increment of excitation frequency (ω) so that radiofrequency voltage under A.C. circuit is reduced. Indeed, resonance exerts its influence of a dynamo context of the Sun. These results are in agreement with Ghosh [19].

An analysis of frictional shearing stresses due to main flow and cross flow has been presented in Tables 1 to 4 for various values of M^2 θ and $\omega\tau$. The influence of viscosity plays a major role in determining the effect of shearing stress at the boundary. Table 1 shows that the frictional shear stress due to main flow (u) direction increases in magnitude with an increase in magnetic force (M^2) whereas it decreases in magnitude with an increase in the angle of inclination of a magnetic field (θ). Here, the magnetic force takes place of a main flow direction with a decisive importance to an excitation frequency to increase frictional shearing stress at the moving boundary while a decreasing effect on frictional shearing stress at the moving boundary due to the distortion of magnetic lines of force with the increase of an angle of inclination of a magnetic field (θ). Table 2 reveals that the frictional shearing stress at the boundary increases in magnitude with the main flow direction with an increase in magnetic force (M^2) for a fixed value of phase angle ($\omega\tau$) while it decreases in magnitude with an increase in phase angle ($\omega\tau$) for a fixed value of magnetic force (M^2). Since driving force is compatible with phase angle, viscous shear exerted by the magnetic force to determine shear flow in a time dependent motion. This happens in the case of a driving force when the magnetic force has an active influence to phase angle ($\omega\tau$) so that the viscous shear at the boundary increases in magnitude as the phase angle ($\omega\tau$) rotates in a line with the dependence on magnetic force (M^2).

Table 3.indicates that the frictional shearing stress due to cross flow (ω) direction decreases in magnitude with an increase in magnetic force (M^2) whereas it increases in magnitude with an increase in the angle of inclination of a magnetic field (θ). From the physical point of view, rotation induces cross flow to determine the effect of viscous shear on cross flow (w). In this situation, magnetic force (M^2) destabilizes the shear flow so that the magnetic lines of force cuts from the central region that decreases the effect of frictional shearing stress on cross flow (w) direction. On the other hand, since the angle of inclination of a magnetic field (θ) exerted by the viscous shear flow to increase the velocity, a stabilizing influence on the frictional shearing stress on cross flow (w) direction becomes significant. It is evident from Table 4 that the frictional shearing stress due to cross flow (w) direction decreases in magnitude with an increase in either the magnetic force (M^2) or the phase angle ($\omega\tau$). In relating to the physical situation of interest, it is stated that the magnetic force opposes the shear flow with an increase in frictional shear stress on the cross flow and the decelerated flow of a viscous shear generates a reduction of magnitude due to increase in phase angle ($\omega\tau$) with impulsive onset into its frictional shear stress effect.

4. CONCLUSION

Representing the analysis of an MHD flow of Couette motion in a rotating environment in the presence of an inclined magnetic field is subjected to a driving force it is rigorously stated that the Sun is a thermonuclear reactor under the influence of a magnetic mirror. Resonance exerts its influence of a periodic driving force that emerges the back bone of a dynamo context of the Sun. Since magnetic field grows towards the resonant level, the growing magnetic field can, at an appropriate level, release the constraint and can, as it were; trigger large velocity fluctuation becomes predominant. A sustainable source of energy leading to a thermonuclear reactor of the Sun corresponds to a laser photon light at the resonance level subject to a resonance fluorescence which is emitted from the Sun with radio wave propagation.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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