

**REPORT OF ONE-DAY SEMINAR/WORKSHOP ORGANISED BY CENTRES /
OVERSEAS CHAPTERS**

Name of Centre / Overseas Chapter:		DURGAPUR LOCAL CENTRE	
Title of Activity:	One day seminar on 'Scope and Applicability of Science in Engineering Fields and it's connection to Environmental Issues'		
Activity under Divisional Board	ICC (Interdisciplinary Coordination Committee)		
Date:	16/03/2019	Venue:	Seminar Hall, DIATM, Rajbandh



Lighting of Lamp by dignitaries



Prof K C Ghanta delivering his welcome address



Prof (Dr) P K Sinha, Principal delivering his address



Dr Dilip Das delivering his presentation

During the inaugural session welcome address was given by Prof K C Ghanta, Chairman, Durgapur Local Centre and said about the importance of such seminar. He clarified the points of relations in Applied Science and Engineering. He also mentioned briefed about Environmental needs and improvements, which can be addressed using applied science and application of engineering.

Special guest Prof (Dr) P K Sinha Principal DIATM told that applied science is required to analyze many matters and materials in laboratory which are basically uses applied sciences. For example The environmental impact of any recycled aggregate (wet) was up to 16~40% higher compared with recycled aggregate (dry). The environmental impact of using recycled aggregate was found to be up to twice as high as that of using natural aggregate, largely due to the greater simplicity of production of natural aggregate requiring less energy..

Among the life cycle impacts assessment of recycled aggregate, GWP (global warming potential) was lower than for artificial light-weight aggregate but greater than for slag aggregate.

Inaugural session lectures were delivered by Prof S P Mukherjee and Dr Dilip Das

1. **Prof S P Mukherjee** discussed about the life of Srinivasa Ramanujan Glimpses of Srinivasa Ramanujan-A Star in the galaxy of Mathematics.

He told that Srinivasa Ramanujan FRS was an Indian mathematician who lived during the British Rule in India. Though he had almost no formal training in pure mathematics, he made substantial contributions to mathematical world and built the base of applied science. He also contributed in other sciences by his mathematics and theories

(Full text is attached)

2. **Dr Dilip Das** presented a paper on very large floating structures(VLFS):

He deliberated and said that Structural and civil engineers are introduced to the world of very large floating structures (VLFS) that have been gradually appearing in the waters off developed coastal cities (and countries with coastlines). Very large floating structures (VLFS) have attracted the attention of architects, city planners, and engineers because they provide an exciting and environmentally friendly solution for land creation from the sea as opposed to the traditional land reclamation method. The applications of VLFS as floating piers, floating hotels, floating fuel storage facilities, floating stadia, floating bridges, floating airports, and even floating cities have triggered extensive research studies in the past two decades. The VLFS technology has developed considerably and there are many innovative methods proposed to minimize the hydro elastic motion, improve the mooring system and structural integrity of the VLFS. After providing adscription of a VLFS and highlighting its advantages (under certain conditions) over the traditional land reclamation in creating space from the sea. This keynote topic summarizes the applications, research and development of VLFS over the past two decades. The input design data, hydro elastic analysis and design considerations for very large floating structures are discussed under water wave theory.

[PRESENTATION ENCLOSED FOR FULL TEXT]

Afternoon session presentations gave by Dr T K Naiya, Mr Subrata Das and Mr Debranj Chatterjee. Topics were respectively are

1. Presentation by: **Dr T K Naiya**

Topic: scaling problem in industry and their remediation – role of engineer. He covered the areas of scaling removal in industry by various method and how to reduce environmental impact by using new chemecals in place of conventional chemicals. {Details are in Presentation attached with this report

2. Presentation by: **Mr Subrata Das**

Topic- Effect of MHD mixed convection nano-fluid flow and heat transfer over an inclined cylinder due to velocity and thermal slip effects over a stretching sheet

In his lecture he delivered the following

Purpose:- The focus of the paper is only on contributions toward the use of MHD mixed convection flow over an inclined stretching cylinder for non-Newtonian nano-fluid. In this study the heat generation/absorption and suction/injection are examined.

Methodology:- Basic equation in form of partial differential equations are converted into a system of ordinary differential equations and then solved using the Spectral quasi-linearization method(SQLM).

Finding:- The validity of our model is to establish using error analysis. Variation of the velocity, temperature, concentration profiles against some of the governing parameter are presented graphically. It is observed that the curvature parameter provides a substantial growth in the velocity but in the vicinity of the cylinder surface curvature parameter has reverse effects on flow velocity. In fact applied magnetic field has the tendency to slow down the movement of the fluid which leads to a decrease in the velocity and momentum boundary layer thickness.

Value/Originality:- This paper acquires realistic numerical explanation for rapidly convergent using the spectral quasi-linearization method. The resulting equations are then integrated using the Spectral quasi-linearization method. The influence of curvature parameter γ , velocity slip parameter λ , Hartman Number Ha , prandtl number Pr , Biot number Bi , Thermophoresis parameter Nt , Eckert number Ec effects are shown graphically.

[Details as attached]

3. Presentation by: **Mr Debranj Chatterjee**

Topic: Magneto hydrodynamic heat and mass transfer of a thin liquid film over an unsteady stretching sheet in a nano-fluid with thermal radiation

According to the presenter's knowledge **Introduction:** The objective of the present work is to analyze the influence of thermal radiation and magnetic field on heat and mass transfer in a thin liquid film of a nano-fluid over a heated an unsteady stretched sheet. Gul et al.[1] investigated the thin film flow in third grade fluid on a vertical belt with temperature dependent viscosity in the presence of magnetic field. El-Aziz [2] studied boundary layer flow over an unsteady stretching sheet to investigate the impact of Hall currents on the flow and heat transfer of an electrically conducting fluid. Abel et al. [3] examined heat transfer in a liquid film on an unsteady stretching surface with viscous dissipation in the presence of external magnetic field. Pal [4] examined the impact of the thermal radiation on heat transfer over an unsteady stretching sheet in the presence of non-uniform heat source/sink effects. Das [5] investigated the influence of thermal radiation on magneto hydrodynamic (MHD) slip flow over a flat plate with variable fluid properties. According to the author's knowledge, there are very few or no studies made on the mass transfer by a thin liquid film over a stretched sheet.

Thus we have considered heat and mass transfer analysis of a thin liquid film over a stretched heated plate in a nano-fluid in the presence of thermal radiation. Numerical results are obtained using a shooting technique together with Runge-Kutta-Fehlberg schemes. The transformed dimensionless governing equations are solved numerically by using fifth-order Runge-Kutta-Fehlberg method with shooting technique. The boundary layer flow problem is first converted into initial value problem by using shooting method to find the unknown initial conditions. The results are discussed for several important physical parameters governing the problem. The effects of Brownian motion and thermophoresis are studied for various values of the physical parameters. It is found that the velocity profiles decrease with increase in the unsteadiness parameter. The effects of various physical parameters on velocity, heat and mass transfer are shown graphically.

Results and Discussions:

It is found that when the value of unsteadiness parameter increases, there seems to increase in the velocity of the flow due to decrease in the dimensional thin liquid film thickness. Also, it is observed that as the value of the unsteadiness parameter increases there is decrease in the velocity profile due to the application of the transverse force which produces a drag due to unsteadiness in the velocity distribution. It is found that when value of Hartman number increases, the velocity of the flow decreases and also decreases the dimensional thin film thickness. This is due to the fact that applied transverse magnetic field produces a drag due to Lorentz force which retards the flow of velocity. It is also determined that concentration gradient profiles converge to a point as the value of Brownian motion number increases. It is also seen that temperature gradient increases with increase in Brownian motion due to increase in the value of the thin liquid film thickness. It is also determined that the variation of the concentration gradient of nano particle volume fraction converge to a point and it is also observed that as the value of thermal radiation parameter increases there is increase in the value of nano particle concentration gradient due to decrease in the thin film thickness.

Conclusion:

Following conclusions are drawn from the computed results:

- (1) Increasing the value of the unsteadiness parameter, there is reduction in the velocity profile of the nano-fluid but the effect is reversed for the nano particle concentration gradient and the nano-fluid temperature gradient.
- (2) An increase in the value of the temperature-dependent heat generation/absorption reduces both the rate of concentration gradient and the temperature gradient.
- (3) Also it is found that the nano particle concentration gradient and temperature gradient decrease with Hartman number but reverse effect is observed by increasing the value of the Brownian motion number, thermal radiation parameter, Lewis number and thermophoresis number. (presentation attached)

Vote of thanks was given by Honorary Secretary, Mr M K Biswal and briefly spoken about the theme and requested the gathering to organise such technical programmes and requested the professionals to take IETI Membership for professional growth.

Abstract of lecture of Dr Soumen de

The propagation of normally incident water waves past a rectangular submarine trench in an ice covered ocean is investigated using linearized potential theory. Here the ice cover is modelled as an infinite thin elastic plate floating on water of finite depth. Using the geometrical symmetry of the trench, the general solution of associated boundary value problem is separated into symmetric and anti symmetric parts in the half plane in terms of the corresponding eigen functions. Matching the general solutions at boundaries of the trench a set of integral equations containing an unknown function with cubic-root singularity is obtained. Appropriate multi-term Galerkin approximations involving ultra spherical Gegenbauer polynomials are used to solve the integral equations. Curves of the reflection and transmission coefficients are given to understand the effect of different physical parameters associated with the problem. The result shows that the introduction of a thin ice cover has a considerable effect on the scattering behaviour. Known numerical results for the coefficients in absence of the ice cover are recovered by choosing flexural rigidity of the ice cover to be very small.

Details of the Sessions:

<p>Forenoon: Inaugural Session Programme & Two invited lectures</p>	<p>1. Lecture by: Prof S P Mukherjee Topic: Glimpses of Srinivasa Ramanujan 2. Lecture by: Dr Dilip Das Topic: very large floating structures(VLFS): application and analysis under water wave theory</p>
<p>Afternoon: Technical Session I Minimum 3 papers or two invited lectures / presentations</p>	<p>4. Paper / Lecture / Presentation by: Dr T K Naiya Topic: scaling problem in industry and their remediation – role of engineer 5. Paper / Lecture / Presentation by: Mr Subrata Das Topic- Effect of MHD mixed convection nanofluid flow and heat transfer over an inclined cylinder due to velocity and thermal slip effects over a stretching sheet 6. Paper / Lecture / Presentation by: Mr Debranjana Chatterjee Topic: Magneto hydrodynamic heat and mass transfer of a thin liquid film over an unsteady stretching sheet in a nano-fluid with thermal radiation</p> <p>Other speakers were</p> <p>1. Sankar Prasad Mondal and topic was ‘non linear triangular intuitionistic Fuzzy number and it’s application in linear integral equation 2. Dr Soumen de –Topic Water Waves Scattering by a Rectangular Submarine Trench in an Ice-Cover Ocean</p>