

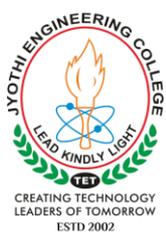


### 3.3.3 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

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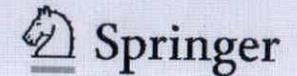
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Third International Conference on  
**Advances in Electrical and Computer  
Technologies 2021 (ICAECT 2021)**

29 - 30, October | Coimbatore, India | [www.icact.co.in](http://www.icact.co.in)

# CERTIFICATE

Publication Partner



E 1039

Reviewed

This certificate is presented to

**Sindhu S**

Department of Electronics and Communication Engineering,  
Jyothi Engineering College,  
Thrissur, Kerala, India.

for presenting the research paper entitled “**Instantaneous Power Estimation Algorithm in Hybrid Power Filter for Power Quality Improvement**” in the Third International Conference on Advances in Electrical Computer Technologies 2021 (ICAECT 2021) organized by PSR Engineering College, Sivakasi, Tamil Nadu, India during 29 - 30, October 2021. The Conference has been organized in ONLINE MODE.

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GENTEC SOLUTIONS

# Enhancement of Veterinary Vaginoscopic Image of Female Canines using Color Transfer Algorithm in $\text{lab}$ Color Space

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**Abstract**— Veterinarians need knowledge of the estrus stage of the reproductive cycle to decide the exact mating time for canine breeding. Through vaginoscopy, a visual examination of the vaginal vault of female canines can be done and the mating period can also be determined. However, due to low light illumination in vaginoscopic examination, the captured images lack visual quality. This hampers accurate determination of the mating period. In this study, an attempt has been made to enhance vaginoscopic images of female canines recorded at the College of Veterinary & Animal Sciences, Mannuthy, Kerala, India. These captured images are subjected to singular value decomposition (SVD), with the aid of a color transfer algorithm in  $\text{lab}$  cone space. SVD results in a singular value matrix that accommodates the majority of the intensity information of the input image. By scaling these singular values, the total intensity of the input image is improved. Further, color transfer in  $\text{lab}$  cone space is carried out to get better enhanced images. These enhanced images are evaluated using various quality parameters such as mean square error (MSE), peak signal to noise ratio (PSNR), entropy and mean. The proposed algorithm has an average MSE of 20.11, while PSNR, entropy and mean values are 35.65 dB, 7.16, and 104.15, respectively. The qualitative analysis shows that this algorithm can be used to enhance the veterinary vaginoscopic images intended for further processing. This algorithm facilitates veterinarians to clearly visualize the wrinkles and bloody discharge during oestrus cycle.

**Keywords**— Veterinary image processing, image enhancement, vaginoscopic imaging, singular value decomposition, color transfer

## I. INTRODUCTION

The advancements in Engineering & technology provide greater challenges and privileges to veterinarians. Image processing techniques have been vividly applied in humans since a very long time to monitor their health conditions. Perhaps, the anatomy of animals being similar to that of humans these technique can be effectively used to monitor their health

condition thereby aiding a great help to the veterinary physicians. There have been positive developments in some of the areas in veterinary sciences such as detection of neurological disorders using focused ultrasound [1] and monitoring poultry [2]. With the developments of imaging technology, image processing has become an important aspects of veterinary science. Various imaging modalities are used in veterinary medicine such as positron emission tomography [3, 4], computed tomography and ultrasound [5, 6]. Information on morphology, physiology, and tissue composition can be obtained through optical imaging [7]. Endoscopy is used to examine the vaginal cavity of female dogs non-traumatically [8].

Vaginoscopy is an important tool to examine the vaginal vault and compare structures like the cervix, vaginal fornix and area outside urethral hole. This technique can be used in both animals and humans to track vaginal malignancies and infection causing such malignancies. The time for diagnosis depends on the complexity of individual cases and the expertise of the examiner. An effective and efficient aid is needed for reproduction management, estrus phase classification, optimal breeding estimation and transcervical insemination facilitation [8].

Endoscopic vaginoscopy helps in determining the nature and extent of disease in the vestibule and vagina. It has various applications such as examination of progesterone assay and vaginal cytology, intrauterine insemination, assisted reproduction, determination of hormonal action and ovulation time by observing the changes in the vaginal mucosa at the time of oestrus cycle of canine. Normally this examination is performed in an awake, non-anesthetized, standing bitch [8].

Insufficient and irregular light sources pose a major challenge in endoscopic imaging. It possess rich information expressed by texture [9]. However, for better diagnosis, the visual quality of images has to be improved. The low signal to

## ANN based Fractional order PID controller design for pitch control of Boeing 747-400

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### ABSTRACT

Fractional order PID is increasingly being used in the fields of control systems, robotics, automobiles, and circuit theory for effective closed loop performance. Artificial Neural Network is introduced for the design of fractional order PID controllers. Using the RBF neural network's parameter turning strategy, a three-term PID controller with five-dimension parameters is realized. Further apply the fractional order PID controller for pitch control to a standard Boeing 747-400 commercial aircraft. Pitch angle stability and longitudinal stabilization of the aircraft system are achieved in particular by manipulating the lift on either a forward or backwards control surface. According to the simulation results, proposed controller has a stronger impact for pitch angle control and longitudinal control than conventional PID controller.

**Keywords:** FOPID, Boeig747-400, Elevator, ANN, Pitch angle, PID

### Introduction :

Boeing 747-400 is a type of commercial airplane used for transportation purposes. An aeroplane is a fixed-wing, engine-driven aircraft that flies according to the dynamic reaction of air against its wings. In steady flight or unaccelerated flight, an aircraft is subjected to four forces which are thrust, rise, weight, and drag. The aircraft becomes dynamically unstable when the centre of gravity (CG) shifts rearward (towards the tail).[1],[2]. Elements of typical aircraft are shown below

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This is to certify that Dr.M.Rajalakshmi of Jyothi Engineering College, Thrissur, India has presented a paper on Optimal Placement of Voltage Regulator and Capacitor for Distribution System in 4<sup>th</sup> *IEEE International Conference on Systems, Computation, Automation and Networking (Virtual Mode)* held at Manakula Vinayagar Institute of Technology on 30<sup>th</sup> and 31<sup>st</sup> July 2021.

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# Investigation on Impact of GaAs and GaN Blazed Grating for High Performance UV-VIS Spectrometer

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**Abstract**—In this paper we considered a periodic structure with a blazed profile and compared the behaviour of light interaction with III-V semiconductor materials, GaAs and GaN. The frequency domain interface of electromagnetic wave is employed to represent wave propagation in a single grating cell. In order to simulate the both faces of the cell, the Floquet periodicity constraints are employed on a periodic basis. This article indicates the recent advances in the use of the novel materials namely GaAs and GaN in blazed gratings, with their refractive index properties. Plots were made of the grating's transmittance and reflectance for every material as a function of the incident angle. Also, we evaluated the performance of these gratings at different thickness ranging from 200nm to 800nm and at different blaze angle range. It was found that, gratings with GaAs with blaze angle  $17.1^\circ$  have a good potential to use it in the range of 200nm to 800nm in reflective type grating and GaN with blaze angle  $23.96^\circ$  is a good material for transmission type grating in the range of 200nm to 800nm.

**Index Terms**—Diffraction, Blazed grating, Optical Grating, Refractive Index, GaAs, GaN.

## I. INTRODUCTION

Gratings are tiny optical devices that separate pure white light into its individual wavelengths. They have a tiny optical dimension and are produced on substrates [1]. When polychromatic light reflects off the grating, it gets dispersed and diverted to the sample material. Each grating manufacturing system's goal is to achieve reasonable parameter values. High-performance MEMS-based spectrometers must therefore have high-performance grating and they can be manufactured using MEMS manufacturing techniques. Grating profiles come in different shapes includes Rectangular and Blazed gratings [2].

The angle of incidence, polarisation of incident light, refractive index of the grating material, and the grating period [3] [4] [5] [6] [7] significantly influence the pattern of energy was reflected into various diffraction orders at a particular wavelength [8]. Lord Rayleigh predicted that changing the grating profile may change the energy distribution into the diffraction orders as early as 1874 [9] [10]. In both infrared and visible applications, certain materials, such as BK7, sapphire, SiO<sub>2</sub>, GaN, and GaAs, can be employed. Yet, the efficiency of such an optical device could be increased by selecting materials that are well suited for the applications.

The saw-tooth grooved Blazed gratings, when compared to rectangular and sine profile gratings, can offer the best efficiency since they can redirect the majority of incident light into a unique order [11]. In other words, it's a form of reflecting or transmission diffraction grating that's been tuned to maximize efficiency in a single diffraction order. As a result, blazed gratings as the diffractive spectroscopic component are extremely attractive in spectroscopy and other applications [12]. This leads to a concentration of maximum optical power in the proper diffraction order and a reduction of residual power in all other orders, especially the zeroth. Each grating can only achieve this condition for a unique wavelength. The blaze angle is the direction in which optimum efficiency is obtained. The problem with this form of grating is that a large anti-blaze angle will considerably limit the efficiency of the intended diffraction order. But by proper tuning of this anti-blaze angle, high efficiency diffraction can be achieved [13].

# Effect of Two-Lane Rural Highway Horizontal Curves on Driver's Galvanic Skin Resistance



Anitha Jacob, Jisha Akkara, K. J. Jinesh, and Jose P. Therattil

## 1 Introduction

Driving is a complex task which needs to handle inputs from road, vehicle, and environment. Along with the above factors, the condition of vehicle and driver himself will be controlling the driver expectations. All these are input which acts as stimuli to a driver. Workload is a measure of the effort required by a driver to complete the task. It is generally observed that very low or very high workload are undesirable. On one hand, it will cause monotonous driving, and on the other hand, it causes fatigue. Eventually, it may result in erroneous driving action that may lead to an accident. The objective of the study is to identify the geometric features that influence workload and to determine the desirable specification of these features for an optimum workload condition.

One of the most sensitive measures for emotional arousal is galvanic skin response or galvanic skin resistance (GSR), also referred to as electrodermal activity (EDA) or skin conductance (SC). Whenever a person is emotionally aroused, his body exhibits physiological changes with increase in sweating. As a result, the electrical conductivity of the skin subtly changes. Due to stimuli, the sweat glands automatically get activated more prominently on forehead, cheek, palm, fingers, and sole of foot. Whenever sweat glands are triggered and become more active, they secrete moisture through pores toward the skin surface. By changing the balance of positive and negative ions in the secreted fluid, electrical current flows more readily, resulting in

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## Study of Mechanical Properties and Hard Water Absorption Behavior of Water Hyacinth Reinforced Starch Composite

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### Abstract

In this paper an attempt has been made to prepare bio-composite using water hyacinth fiber as reinforcement and potato starch as matrix. The renewable resource, water hyacinth is used as the major composition of the proposed bio-composite. Since the bio polymer can contribute better mechanical properties, it can act as a substitute for the existing synthetic fibers. The biodegradable, environmentally friendly and less expensive characteristics of the bio composite, find it suitable for automotive and conventional industrial applications. The effect of the fiber length ranging from 10 mm to 40 mm verses tensile strength and bearing strength are included in the research work. The simplest and most effective hand layup method is used to prepare the bio fiber from water hyacinth after duly seasoning the raw stems in the controlled environment. The bio composite made up of 70% potato starch as matrix is dissolved in sufficient amount of water in which 30% of glycerol is added to the reaction mixture. Magnetic stirrer capable of generating variable speed ranging from 800 rpm to 1200 rpm, with inbuilt heating mechanism made up of stainless steel material is used to prepare the reaction mixture. The stirring process is continued till the required viscosity is obtained. The specimen is kept in the electric oven and the water content is removed. Before investigating the mechanical properties, the specimen was compressed to 600 psi ( $\approx$  42 bar) pressure. Using Universal Testing Machine (UTM) the tensile strength of the composite was investigated in the ambient temperature and pressure. The specimens- with and without reinforcement were studied to find the effect of water absorption capability which is function of nature solvent and matrix. Based on the experimental results, it was concluded that bio composite is a potential candidate to serve the needs of the industry.

### Key Words:

Bio composite, Water Hyacinth, Tensile strength, bearing strength, Water absorption



# A Study on Effect of Primary and Secondary Reinforcements in Hybrid Metal Matrix Composite

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**Abstract.** In this work, the influence of variation in volume fractions of silicon carbide (SiC) particles and boron carbide (B<sub>4</sub>C) particles reinforced in 99.8% pure aluminum matrix mixed with 2% graphite (Gr) is studied. Three different proportions of hybrid aluminium metal matrix composite (HAMMC) are casted using the stir casting technique. The effect of percentile variation of reinforcing particulate materials and solid lubricant are evaluated by compression test, tensile test, micro-hardness, impact test and wear as per ASTM standards. The distribution of reinforced particulates in the matrix is studied with the help of optical micrographs, which show the homogenous distribution of ceramic particulates inside the aluminium matrix. With the higher addition of B<sub>4</sub>C particles, compressive strength, tensile strength, energy absorption characteristics and micro-hardness tends to increase due to the formation of Mg<sub>2</sub>Si phase.

**Keywords:** Hybrid aluminium composite, Stir casting technique, Tensile strength, Hardness, Wear.

## INTRODUCTION

Metal matrix composites (MMCs) have been the subject of applied research and scientific investigation for almost 30 years, as these advanced materials with tailored applications are gradually introduced in specific engineering fields [1]. The greatest asset of MMCs is their combination of properties of a metal matrix with those of reinforcements, usually ceramic, providing the required properties to meet challenging and specific tasks [2-4]. There is an excellent variety of material combinations (type of reinforcements, fraction additions, shape and processing methods) providing rise to a wide spectrum of MMCs, each with a specific property [5]. Selvakumar et al. [6] developed hybrid aluminium metal matrix composites (HAMMCs) through powder metallurgy route considering pure aluminium powders, copper and silicon carbide (SiC) powders of varying fractions. They found that 7.5% addition of SiC and 4% Cu addition in aluminium matrix produces better mechanical and wear properties as higher SiC addition results in poor bonding. Velavan et al. [7] selected a stir casting method for fabricating HAMMC consisting of AA6061 reinforced with 10% boron carbide (B<sub>4</sub>C) and varying proportions of mica as a solid lubricant and performed wear studies and found that the inclusion of solid lubricant enhances the wear resistivity of HAMMCs. Anbuezhayan et al. [8] incorporated silicon nitride particles in Al-Mg-Zn alloy and characterization studies. They found that, with the inclusion of ceramic reinforcements, mechanical strength was higher due to the restriction of dislocations and load bearing capacity of reinforcements. Ragupathy et al. [9] performed tribological studies on heat-treated HAMMCs prepared through stir casting technique and found that the inclusion of solid lubricant and heat treatment significantly improves the properties of the prepared composite. James et al. [10] reinforced Zirconium dioxide (ZrO<sub>2</sub>) and Aluminium oxide (Al<sub>2</sub>O<sub>3</sub>) in AA6061 using stir casting route and found that micro-hardness was increased by 70% when compared with parent alloy and tensile strength was higher with the inclusion of hybrid reinforcements. Pitchayapillai et al. [11] used the stir casting technique in AA6061 to fabricate hybrid composites by reinforcing (4, 8, and 12 wt.% of Al<sub>2</sub>O<sub>3</sub>) and soft solid lubricant of molybdenum disulphide (2, 4, and 6 wt.% of MoS<sub>2</sub>). They identified that increasing the