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Theory and Applications of Mathematical Science Vol. 2

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Synopsis

This book covers all areas of mathematical science. The contributions by the authors include nonlinear integral equation; Darbo's fixed point theorem; Weibull parameters; MATLAB; trapezoid graphs; fixed point; common fixed point; fuzzy cone metric space; Dirichlet problem; Quadrature surfaces; agent-based modelling; nonlinear dynamics; topological groups; free topological groups; nonconsistency of the conservation laws equations; degenerate transformation; discrete solutions; meromorphic functions; Pad-approximants; (p, q) -order and (p, q) -type; logarithmic capacity; quasilinearly subharmonic;

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G. M. Krishnaiah is presently working as Professor and HOD of Chemistry Sir MVIT, Bengaluru. He obtained his M.Sc. and Ph.D. degrees in Chemistry from Bangalore University. He has taught Engineering Chemistry for the last 28 years and has published 16 research papers in peer-reviewed journals. At present, he is guiding students for their Ph.D. degree. He served as the member of Board of Studies in Basic Sciences, Ph.D. Registration Expert Committee and Chairman of Board of Examiners for VTU, Belagavi. He was also awarded the best Professor in Chemistry by Dewang Mehta National Education Award.

Prashanth G. K., Assistant Professor in the Department of Chemistry, Sir MVIT, Bengaluru obtained his B. Sc. degree with 2nd place and M.Sc. degree with 3rd rank and gold medals from the University of Mysore. He obtained his M.Phil. degree in Chemistry and presently pursuing Ph.D. degree. He has over 13 years of teaching experience. He has published many research papers in reputed peer-reviewed international journals and presented several research articles in national and international conferences.



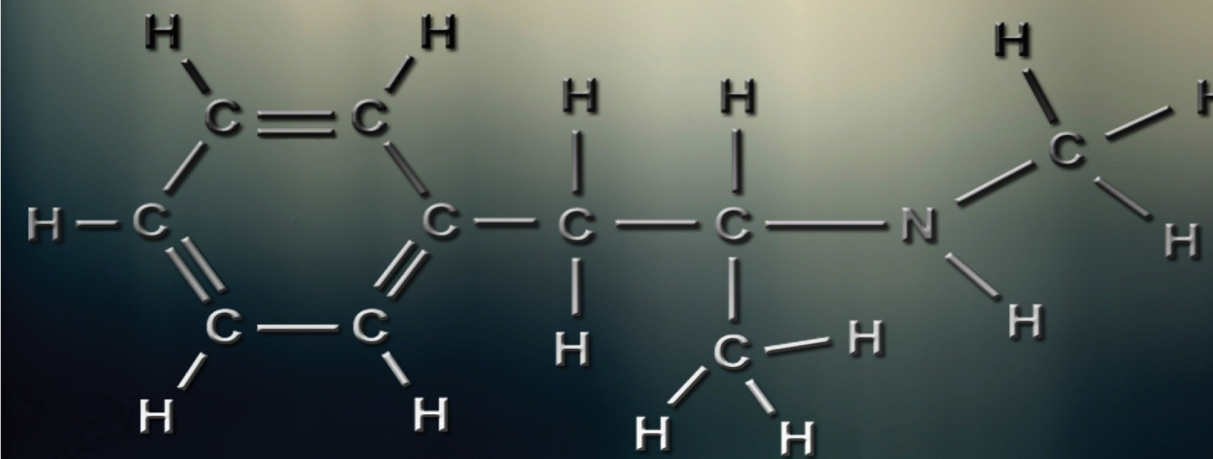
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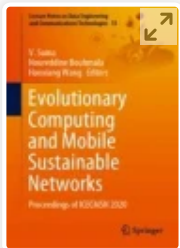
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Evolutionary Computing and Mobile Sustainable Networks pp 887–897

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Foot Ulcer and Acute Respiratory Distress Detection System for Diabetic Patients

[M. S. Divya Rani](#) , [T. K. Padma Gayathri](#), [Sree Lakshmi](#) & [E. Kavitha](#)

Conference paper | [First Online: 01 August 2020](#)

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Abstract

Health care and wellness management for a diabetic are one of the most promising information technology in the field of medical science. A healthcare monitoring system is necessary to constantly monitor diabetic patients' physiological parameters. Hence the major scope of this proposed project work is to develop a smart health

monitoring system that overcomes many complications in diabetic patients by periodically monitoring patients' heartbeat rate, SPO2 (Peripheral capillary oxygen saturation) level, foot pressures, etc. Therefore, the IoT concept is used and sensors are connected to the human body with a well-managed wireless network that periodically monitors the physiological parameters of the body to avoid high risks in diabetic patients. Continuous health monitoring remotely works because of the integration of all components with wearable sensors and implantable body sensors networks that will increase the detection of emergency conditions at risk. Also, the proposed system is useful to operate remotely because of inbuilt Wi-Fi in the system.

Keywords

Diabetic Foot Ulcer (DFU)

SPO2 (Peripheral capillary oxygen saturation)

ECG (electrocardiogram)

Acute Respiratory Distress Syndrome (ARDS)

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In recent years, conventional energy sources are depleting and getting exhausted. In replacement of this, solar Photovoltaic (PV) systems are used because of its free availability, renewabiiti and less operating cost. But the constraints such as low efficiency, dependability on weather conditions are overcome by using maximum power point tracking(MPPT) algorithms and efficient converters to produce the maximum power output. MATLAB/Simuiink is used to model and analyze PV array, MPPT algorithms, and converters. In this paper, recent research developments in PV array, various MPPT techniques, many efficient Converters are presented. This paper will give an overall idea about the present research trends in the field of Solar Photovoltaic systems.

Published in: 2020 5th International Conference on Devices, Circuits and Systems (ICDCS)

Date of Conference: 05-06 March 2020

INSPEC Accession Number: 19569023

Date Added to IEEE Xplore: 23 April 2020

DOI: 10.1109/ICDCS48716.2020.243584

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Publisher: IEEE

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Conference Location: Coimbatore, India

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Home automation system is gainif a significant research attention in recent years. It helps us in leading a comfortable life and quality of lifestyle is gradually uplifted. The different methodologies used in this system have been discussed. In modern days, a smartphone having an android application is used to supervise and control the appliances present in the home automation system. In this paper different types of communication methodologies such as GSM, IoT, Wi-Fi, and bluetooth are reviewed. The pros and cons of these techniques along with their features have been presented. Based on this paper the user can choose the best suitable methodology depending upon their personal needs and specifications for implementing an efficient automation system.

Published in: 2020 Fourth International Conference on Inventive Systems and Control (ICISC)

Date of Conference: 08-10 January 2020

INSPEC Accession Number: 19896920

Date Added to IEEE Xplore: 19 August 2020

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This paper presents the low-cost power converter learning kit for power electronics lab in the undergraduate electrical engineering course. This paper also examines the learning outcome of an Arduino Nano and MOSFET based converter learning kit. With help of this converter kit, the student can learn the working and control of all types of basic power converter circuits which is present in their electrical engineering undergraduate curriculum. This is a plug and play kind of learning kit with minimum connection changes required to convert from one type of power converter to other types of power converter circuit. This learning kit facilitates to learn and control all type of basic power converter circuits like the chopper, inverter, AC voltage controller, and rectifier. It supports the single phase as well as the three-phase power conversion and control. The total cost of the basic converter kit is less than Rs.1400 i.e., which is less than \$20. The effective usefulness and ease in use of the kit are evaluated by the feedback from the third year students of electrical engineering course. The collective feedback result shows the low-cost converter kit is much helpful to understand the basic concepts of the power converter circuit.

Published in: 2020 Fourth International Conference on Inventive Systems and Control (ICISC)

Date of Conference: 08-10 January 2020

INSPEC Accession Number: 19896907

Date Added to IEEE Xplore: 19 August 2020

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Condition monitoring for bearing faults is remaining more vital in the present scenario. This study presents a simple approach for diagnosing various bearing faults of induction motor, which uses effective statistical time domain features. The statistical time domain features like mean absolute value, zero crossing, waveform length, slope sign changes, simple sign integral and Willison amplitude are considered. The performance of features is studied with 6 feature ensembles (FEs) to identify the effective FE for fault diagnosis in the induction motor. This identification is based on the classifications that are performed by using linear discriminant analysis (LDA), naïve Bayes (NB), support vector machine (SVM) and logistic model tree (LMT) classifiers. Each feature ensemble is investigated for 5 datasets derived from a bench mark database for a maximum of 48 faulty conditions. The results indicate the FE constituting six features with SVM classifier outperforms other fault diagnosis techniques.

Published in: 2020 3rd International Conference on Intelligent Sustainable Systems (ICISS)

Date of Conference: 03-05 December 2020

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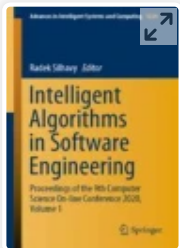
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Simplified Framework of Natural Language Processing for Structure Management of Current-Age Data

[J. Shruthi](#)  & [Suma Swamy](#)

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Abstract

The adoption of natural language processing has become one of the essential part of artificial intelligence. Although, the conventional concept of natural language processing has been researched from more than a decade but still the better results are yet to arrive. Review of existing literatures shows the cases where case specific studies are carried out which still doesn't address the problem associated with lightweight computational model.

Therefore, the proposed study introduces a simplified modeling of natural language processing which is capable of handling the unstructured data unlike existing system without scoring any dependencies on extra resources or cost. The study also introduces an integrated syntactical-based and semantic-based which is quite novel and simplified in its form. The study outcome shows that it offers almost instantaneous response time for all the internal processes.

Keywords

Natural language processing **Text mining**

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Soft Switched Bi-directional Power Converter for Photo Voltaic System

L. Sahaya Senthamil¹, R.Sivapriyan², C.V. Mohan³, P. Sundaramoorthi⁴

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Abstract. This work proposes the implementation of a bidirectional current-fed soft switched converter for solar photo voltaic system is examined and covered with information. Effective function of the bi-directional buck-boost topology is guaranteed by continuous-duty buck-boost circuit under large voltage spectrum. In battery charger mode, phase shift modulation and pulse width modulation control are employed. In order to allow the MOSFETs to have zero voltage switching, a feedforward loop was applied to the charging mode of the battery. Compared with the conventional bidirectional soft switched converter, this one would definitely be better suitable for designing such magnetic components. This bi directional converter is implemented for a solar structure and experiment results are obtained.

Keywords: Bi Directional Converter, Solar Photo Voltaic, Soft Switching, Maximum Power Point Tracking.

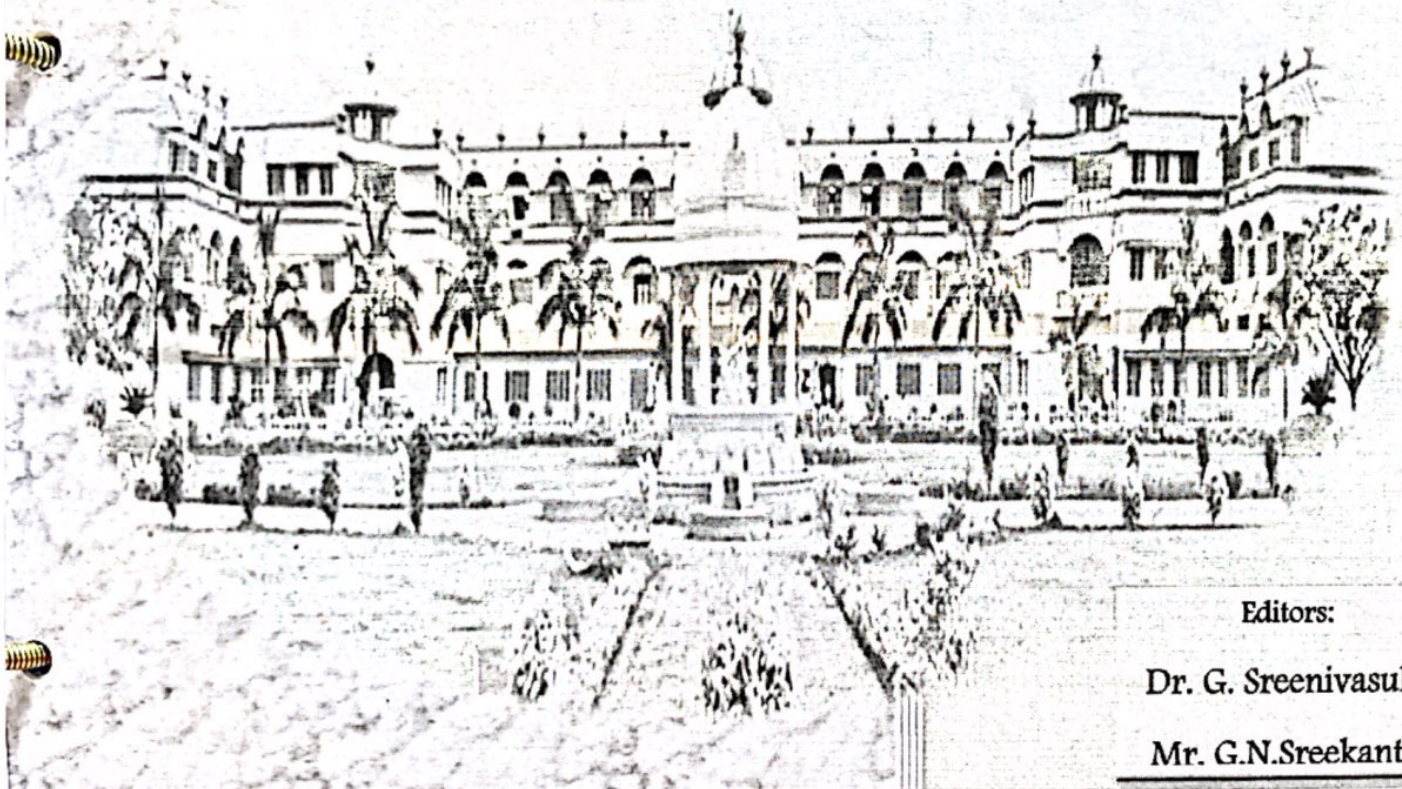
1 Introduction

The application of solar photovoltaic is a modern concept and therefore must be applied by different method and technique. Electronic controls are used for the operation of thermal power plants. It is important to contain high performance transformer. Boost converters have lots of uses in high current, heavy loads settings. Solar photovoltaic power generation module is a strong choice for high voltage bus systems since it transforms sunlight into electricity. Since Converters that are actually feeding current are more powerful than conventional Converters that are actually feeding voltage, they have less limitations. Present limiting feature is important when interacting with very broad currents. This is that the former has more flaws than the latter. Transformer parasitic are very efficient in addressing Switching issues. and heavy switching losses of LCC. The earliest mechanical coupling between trains is a soft switched converter. There are different forms of soft switched series and parallel converters. This new breakthrough can be implemented by the researchers in many forms. The major categories of LC resonating converters are LCF-type, LC-type, LLC-type, LCC-type, CLLC-type, etc. The frequency varies to balance the rate of usage.

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Studies on Prevention of Landslides

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Abstract—Landslides are a major problem all across the world especially in the slopy areas where the natural tendency of the soil is to create debris with the gravitational force. This paper presents critical review on analytical studies and Experiments studies of prevention of landslides and an attempt has been made to analyse and to conduct Experiments the prevention methods few of which have already been done are proposed with new improvisations and few new methods are to be proposed. The main focus of studies was done for Kodagu District which lies in the south western part of Karnataka state and part of the mighty Western Ghats were drainage patterns and Emphasis on eco-friendly methods of prevention through vegetation has been suggested and new methods of prevention of landslides are suggested and also an attempt, using new innovation has been done to the prevention through the proposal of finite element analysis.

Keywords: climate change, Rainfall Distribution, Kodagu District, Stability Analysis, drainage

I. INTRODUCTION

Landslides occur in all hilly terrains in response to a wide variety of conditions and triggering processes like heavy rainstorms, cloudbursts, earthquakes, floods, cyclones and haphazard human activities. CRED data indicates 8,658 human casualties due to landslides and avalanches between 1990 and 1999 but it appears to be significantly underestimated. As landslides are frequent and widespread, the annual cumulative losses worldwide amount to tens of billions of USD in terms of lost property, environmental damage, repair works, and the maintenance of defense measures (source: Page 61, World Atlas of Natural Hazards by Bill McGuire, Paul Burton, Christopher Kilburn and Oliver Willets). The frequency of landslides is strongly influenced by the return periods of triggering events like rainfall and earthquakes.

More than 5000 people are buried alive under landslides and economic losses of >4 bn USD are suffered every year globally. Continent-wise, Asia suffers the maximum damages / losses due to landslides and among the Asian countries, South Asian nations are the worst sufferers and even among South Asian countries, India is one of the

worse affected by landslides. As individual landslides usually affect limited local areas and residents, damage resulting from landslide hazards was not recognized as a problem of national importance and were not addressed on a national basis. The absence of coordinated national approach to mitigating the detrimental effects of landslides resulted in a reduced ability of the States and Local Government agencies to apply the important lessons learnt, often at considerable expense, in other parts of the country.

As a result there is a need to address this problem both at national and local levels therefore In this paper studies an initiative istaken to address the problem at local district level in kodagu, district of Karnataka where a number of landslides have been occurred.

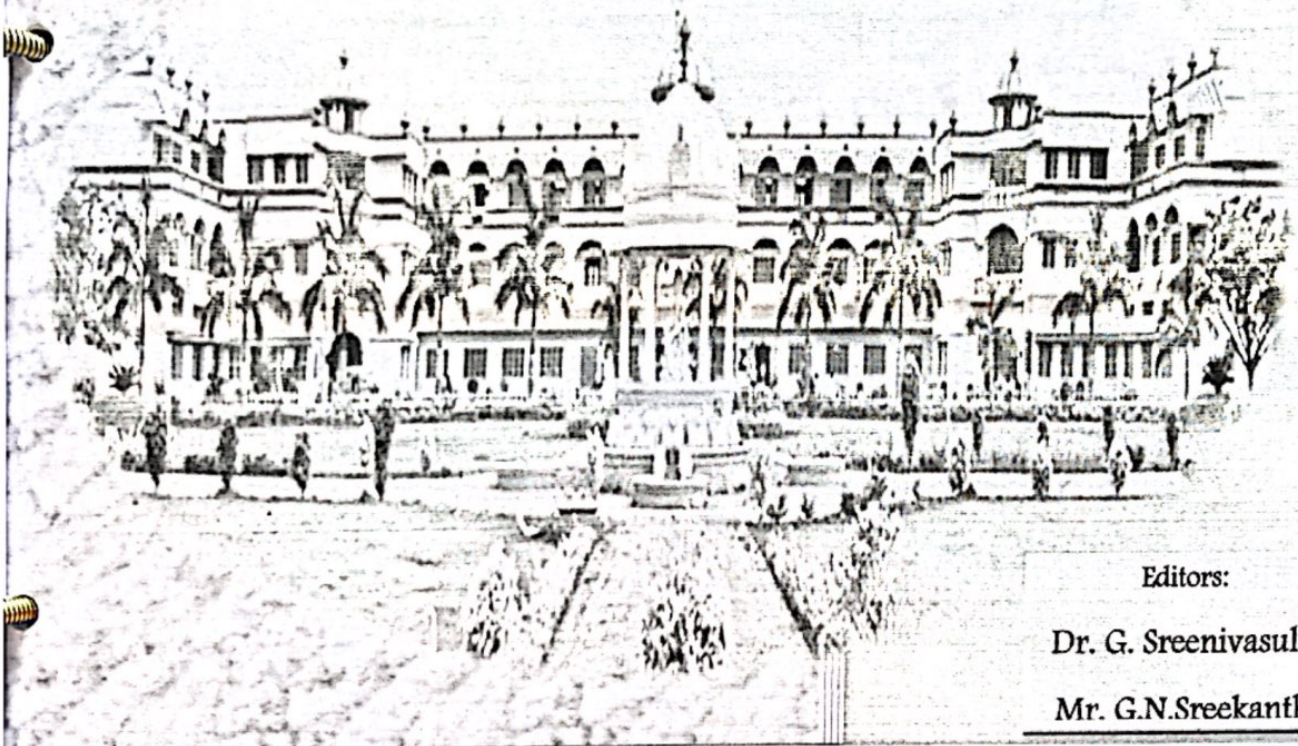
II. TRADITIONAL METHODS OF SLOPE STABILITY ANALYSIS

Most Research on soil mechanics or geotechnical engineering will include reference to several alternative methods of slope stability analysis. In a survey of equilibrium methods of slope stability analysis reported by Duncan (1996), the characteristics of a large number of methods were summarized, including the ordinary method of slices (Fellenius, 1936), Bishop's Modified Method (Bishop, 1955), force equilibrium methods (e.g. Lowe & Karafiath, 1960), Janbu's generalized procedure of slices (Janbu, 1968), Morgenstern and Price's method (Morgenstern & Price, 1965) and Spencer's method (Spencer, 1967). Although there seems to be some consensus that Spencer's method is one of the most reliable, research continue to describe the others in some detail, and the wide selection of available methods is at best confusing to the potential user. For example, the controversy was recently revisited by Lambe & Silva (1995), who maintained that the ordinary method of slices had an undeservedly bad reputation. A difficulty with all the equilibrium methods is that they are based on the assumption that the failing soil mass can be divided into slices. This in turn necessitates further assumptions relating to side force directions between slices, with consequent implications for equilibrium. The assumption made about the side forces is one of the main characteristics

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Design of Sustainable Buildings

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Abstract—Green building is a key architectural concept of the 21st century and it is the technique of constructing or transforming structures to become environmentally conscientious, sustainable and resource-efficient throughout their life cycle. The aim of a green building design is to minimize the demand on non-renewable resources, when in use, and maximize the reuse, recycling, and utilization of renewable resources. It maximizes the use of efficient building materials and construction practices; optimizes the use of on-site sources and sinks by bio-climatic architectural practices; uses minimum energy to power itself; uses efficient equipment to meet its lighting, air-conditioning, and other needs; maximizes the use of renewable sources of energy; uses efficient waste and water management practices; and provides comfortable and hygienic indoor working conditions. In this paper studies and analyses on few methods and designs have been carried out which can be installed and adopted in a building to improve the overall efficiency of the building and to make it more sustainable.

Keywords-Sustainable Building, Sustainable Materials, Green House Gas (GHG); Rain Water Harvesting; solar energy, Grey Water Recycling and Reuse, Ventilation.

I. INTRODUCTION

Climate is changing fast globally because of increased energy consumption and GHG emission. As per Indian Green Building Council (IGBC) Report, at present, conventional buildings contribute as much as one-third of total global greenhouse gas (GHG) emissions. The building sector contributes up to 30% of global annual greenhouse gas emissions and consumes up to 40% of overall energy. This impacts the climate change resulting in few effects such as water stress and reduction in the availability of fresh water, threat to agriculture and food scarcity, shift in area and boundary of different forest which is a great threat to biodiversity. Tremendous growth in industrial sector and advancements in technology has increased the use of energy all over the world, causing an irreversible damage to the global environment; this will have an undesirable impact on the quality of life of the future generations. Water which is a vital resource for the occupants gets consumed continuously during building construction and operation. Therefore it is required to adopt few methods and techniques to conserve, recycle and reuse this water. Several building processes and occupant function generate large amount of waste. All these are polluting the environment and increasing Green House Gas (GHG).

Air pollution is one of the biggest climate crises facing our nations today. Northern India's recent crisis is a combination of many factors: exhaust fumes, construction dust, industrial emissions, forest degradation, and crop burning. Simply breathing certain city air is like smoking a pack of cigarettes a day which can actually cut off more than 10 years of lifespan of the people residing in these cities. All these environmental problems are affecting the quality of life and the health of the people.

At a global level the building sector has the largest potential for significantly reducing greenhouse gas emissions compared to other major emitting sectors.

Sustainable building approach is considered as a way for the building industry to move towards achieving sustainable development taking into account the environmental, socio and economic issues. Ecologically sustained development (or sustainability) is defined as development that improves the total quality of life in a way that maintains the ecological processes on which life depends.

The key process difference between green and conventional buildings is the concept of integration, whereby a multi-disciplinary team of building professionals work together from the pre-design phase through post-occupancy to optimize the building for environmental sustainability performance, and cost saving.

II. WATEREFFICIENT TECHNOLOGIES

Water efficiency refers to the decrease in the usage of water as well as decrease in the wastage of water. Wastage of water or its extra usage leads to drawing out of more water from the fresh water resources, resulting in their depletion. Thus, few water efficient technologies can be used to conserve potable as well as non-potable water and ultimately save the already limited fresh water resource. Few Water efficient technologies which can be used in buildings mainly include water saving fittings and fixture rain water harvesting and recycling and reuse of grey water.

A study of household water consumption in different areas revealed that almost 50% of the total water is used in baths and toilet flushes. Thus, instead of using luxurious water wasting fittings and fixtures, water saving ones can be used. These include use of low flow shower heads and low flushing toilets instead of bathtubs and normal flushes, which use more water respectively. Other such fittings and fixtures

Proposal and Measures for Improvement of Functioning of Mekhri Circle Junction

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Abstract

During the past decade most of the cities have undergone chaotic growth of Industrialization and urbanization of country. Consequently, the urban population has to travel bigger distances within least probable time. To accomplish travel demand the intersection should be given least resistance to traffic flow so that the travel time can be lessened. In this study an attempt has been made to reduce the travel time, stopped delay and queue length by redesigning the existing traffic signal to regulate the traffic flow.

Mekhri Circle is considered one of the most important intersections in Bengaluru. The three phased signalized intersections at Mekhri Circle junction was considered as the primary study area. At the intersection present signal timing, classified volume count, stopped delay, queue length and optimum cycle length were measured. By redesigning the existing signal design it is observed that the flow of traffic is more efficient.

Keywords: Signalised Intersection, Traffic Signal Design, Stopped Delay, Grade Separated intersection,

I. INTRODUCTION

The world is facing traffic congestion which is a global issue. The growth of vehicles has increased due to urbanization and industrialization. Increase in traffic volume has caused problems in traffic operations like accidents, delay, congestion, fuel consumption, pollution, etc. specially at intersections. Therefore, it is required to adopt suitable measures at the intersections in urban areas for better regulation and control. The number of families with cars has become much more than what the country is able to manage.

With families getting smaller and the total number of motor vehicles exceeding the total number of heads per family,

the traffic congestion has increased. Due to the increase in the density of vehicles at any given time in an urban place the pollution has also increased and is leading to lot of health problems.

A. Urbanisation

Urbanization is simply defined as the shift from rural to an urban society, which is triggered by social, economic, and political developments.

Urbanization is not merely a modern phenomenon, but a rapid and historic transformation of human social roots on a global scale.

B. Urbanization in India

The growth of urbanization in India is basically through two ways, one is through increase in the urban population, which will be natural and the second one is through migration, which is result of people migrating from rural to urban areas and also from small towns/cities to big metros.

It took nearly 40 years (from 1971 to 2008) for India's urban population to rise by nearly 230 million; it will take only half that time to add the next 250 million.

The many cities in our country, are becoming extremely crowded and if we see the 20 most densely populated cities in the world, out of which five will be from India including, Bengaluru, Delhi and Mumbai.