

POWER SYSTEM CONTROL AND ECONOMIC OPERATION OF POWER SYSTEM

Dr. M. RAMESH
VARAPARLA HARI BABU

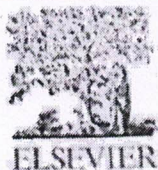
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A review of performance optimization and current research in PMEDM

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ABSTRACT

The EDM method is non-conventional in machining for machining of geometrically unpredictable or hard materials and electrically conductive materials that cannot be machined with ordinary forms of machining. With latest strategies, research has emphasized EDM's increased machining efficiency. PMEDM is an ongoing method where a Mixed conductive powder with the dielectric liquid to improve EDM machining capabilities in this direction. This paper introduces the review work done to improve the performance characteristics of machining like MRR, SR and TWR for different Machining parameters like I_p , Duty factor, T_{on} , T_{off} , Work piece material, powder type, concentrated powder with different dielectric liquids and powder materials. Also in the paper reports and summaries Current trends in the research, PMEDM using various powders such as Nano powders mixed in dielectric fluids and examined the current challenges. future scope of research and impediments of the PMEDM process.

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1. Introduction

EDM is a non-conventional technique of electro-thermal machining, sometimes called spark eroding, sparks machining method. It is used primarily for machining hard materials and high quality safe materials such as titanium, super combinations of solidified steels that are generally used in aircraft and other mechanical applications [1]. It is manufacturing processes where electrical energy is acquired by favoured shape to produce electrical sparks, and the material removal is due to spark thermal energy [2]. In EDM work piece is generally associated with positive terminal and tool with negative terminal. And possible differentiation is connected between work piece and tool. Many input parameters mainly affect EDM efficiency such as circuit voltage (V_o), operating voltage (V_w), peak current (I_w), t_{on} , t_{off} , work piece gap and tool gap, polarity, dielectric medium and internal flushing through the gap of the spark. EDM is an electro thermal technique involving the Plasma channel arrangement between the tools and piece of work, primarily used to machine such hard-to-machine alloys as well as high quality and temperature safe alloys (HSTR). These materials are widely in the die and mould manufacturing industries [3].

1.1. Working principle of PMEDM

PMEDM was developed in the previous few centuries One of the most significant and creative processes to overcome the inconvenience of the EDM method and to upgrade the EDM limit [4]. The concept of powdered blended EDM appears in Fig. 1. PMEDM is used to enhance the MRR and to decrease the contrast between SR and standard EDM by increase the Work piece gap and electrode gap. When the voltage was applied to the Powder particles, it becomes strong and continues with a crisscross pattern [5]. These loaded Particles are being accelerated and behave as conductors promoting the gap breakdown due to the electrical field. This improves the gap between the piece of work and the tool. These particles come close to one another under the sparking region and organize in the shape of the chain like constructions. In the present flow direction, the Powder particles interlocking happen. The formation of chain enables to bridge the distance between the discharge electrodes. Due to the impact of bridging, the insulation intensity of dielectric fluid decreases, resulting in a simple short circuit. This results in early explosion in and below the gap area the series discharge begins. The quicker sparking in a spill creates quicker erosion from the job piece's surface and thus improves the MRR. PMEDM was used to enhance rough machining effectiveness. PMEDM has enabled machining efficiency to be improved by

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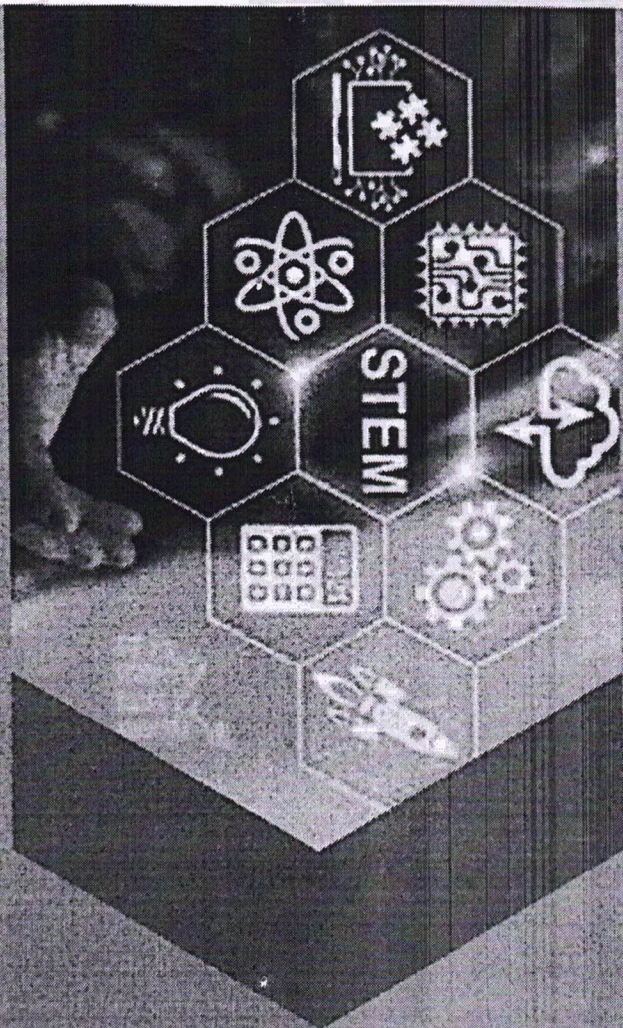
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A Review on Optimization of Machining Performances and Current Research Work in Die Sinking EDM

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Abstract— Electrical discharge machining is a non-traditional machining process, used for machining of geometrically complex or very hard and electrically conductive materials which cannot be machined by conventional machining processes. The present work reviews extensive research in powdered mixed Electrical Discharge machining (PMEDM). In PMEDM process powders can be mixed in separate tank in order to improve EDM machining performance. The emphasis is given in the field of PMEDM mechanisms, influences of powder characteristics and machining input parameters on various machining responses. In this article, comprehensive review of the research going on in the PMEDM of optimization of machining parameters were presented and discussed the summary of work performed by the earlier researchers on performance of EDM process parameters through in depth literature survey. This paper also reports and summarized on the current research trends in PMEDM by using water and nano powders mixed into dielectric fluids and discussed the current challenges, future research scope and limitations of PMEDM process.

Key words: PMEDM, Machining parameters, Dielectric fluid, Nano powders

1. INTRODUCTION

Electrical Discharge Machining (EDM) is a nonconventional process. EDM originally observed by English Scientist Joseph Priestly in 1770 the development of EDM was very inaccurate and with failure. Further two Russian scientists, Dr. B. R. Lazarenko and Dr. N. I. Lazarenko in 1943, developed EDM process. Also they invented the relaxation circuit and a simple servo controller too, that helped maintain the gap width between the tool and the work-piece. Further more investigation is done in the improvement of EDM process for the development of machining characteristics in the direction of material removal rate and surface finish.

1.1 WORKING PRINCIPLE OF EDM

EDM Consists of the following components, Power supply Unit – Used to provide the Direct Current to produce spark between the tool and work piece.
2. Dielectric fluid reservoir, pumps, filters and control valve – Used to supply dielectric to the tool and work piece. The tool and work piece are immersed in dielectric fluid.

3. Work piece holder, Tool holder and table – Used to hold tool and work piece firmly so that the vibrations are reduced.
4. Servo control Mechanism – Used to provide a constant gap between tool and work piece.

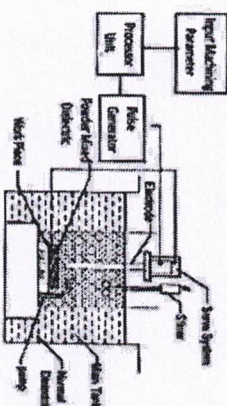


Fig: Die sinking electrical discharge machining

1.2 PROCESS PARAMETERS OF EDM

Unconventional Machining Process depends upon the number of process parameters. These parameters will affect the output performance of EDM processes by varying the input characteristics. These controlling parameters are mainly divided into Electrical and Non-electrical parameters. Electrical Parameters Electrical parameters such as the Ton, Toff, Voltage and Peak Current are playing an important role in output performance measures. Here we discuss about the effects of electrical parameters on the various performance measures. Discharge Voltage It is a voltage which is produced in between the Work piece and Tool when DC power supply is given to the circuit. Peak Current is the most influencing factor in EDM. It is nothing but the amount of power used in EDM. Average Current It is a maximum current available for each pulse from the power supply. Average current (A) = Duty Factor (%) x Peak Current Pulse On It is the duration of time for which current is allowed to flow per cycle. Pulse Off It is the duration of time between each spark.

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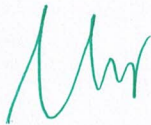
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ENGLISH AND COMMUNICATION SKILLS

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SYLLABUS

Module-I	GENERAL INTRODUCTION AND LISTENING SKILL
Introduction to communication skills; Communication process; Elements of communication; Soft skills vs. hard skills; Importance of soft skills for engineers; Listening skills; Significance; Stages of listening; Barriers and effectiveness of listening; Listening comprehension.	
Module-II	SPEAKING SKILL
Significance; Essentials; Barriers and effectiveness of speaking; Verbal and non-verbal communication; Generating talks based on visual prompts; Public speaking; Addressing a small group or a large formal gathering; Oral presentation; Power point presentation.	
Module-III	VOCABULARY AND GRAMMAR
The concept of Word Formation; Root words from foreign languages and their use in English; Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives; Synonyms; Antonyms; Standard abbreviations; Idioms and phrases; One word substitutes Sentence structure; Uses of phrases and clauses; Punctuation; Subject verb agreement; Modifiers; Articles; Prepositions.	
Module-IV	READING SKILL
Significance, Techniques of reading, Skimming-Reading for the gist of a text, Scanning - Reading for specific information, Intensive, Extensive reading, Reading comprehension, Reading for information transfer, Text to diagram, Diagram to text.	
Module-V	WRITING SKILL
Significance; Effectiveness of writing; Organizing principles of Paragraphs in documents; Writing Introduction and conclusion; Techniques for writing precisely, Letter writing; Formal and Informal letter writing, E-mail writing , Report Writing.	
Text Books:	
1. Handbook of English (Prepared by the faculty of English, IARE).	
Reference Books:	
1. Norman Whitby, -Business Benchmark: Pre-Intermediate to Intermediate – BEC Preliminary, Cambridge University Press, 2 nd Edition, 2008. 2. Devaki Reddy, Shreesh Chaudhary, -Technical English", Macmillan, 1 st Edition, 2009. 3. Rutherford, Andrea J, "Basic Communication Skills for Technology", Pearson Education, 2 nd Edition, 2010. 4. Raymond Murphy, -Essential English Grammar with Answers, Cambridge University Press, 2 nd Edition, 2010. 5. Dr. NV Sudershan, -President Kalam's Call to the Nation, Bala Bharathi Publications, Secunderabad, 1 st Edition, 2003.	

HEAT POWER ENGINEERING

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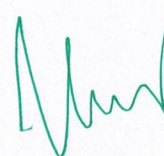
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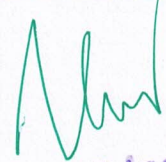
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HEAT POWER ENGINEERING

DETAILED SYLLABUS

Unit	Name of the Topic	Page No
I	<p>BASICS OF THERMODYNAMICS AND THERMODYNAMIC PROCESSES OF PERFECT GASES</p> <p>Introduction:- Definitions and units of mass, weight, volume, density, specific weight, specific gravity and specific volume – pressure – units of pressure – temperature – absolute temperature – S.T.P and N.T.P conditions – heat – specific heat capacity at constant volume and at constant pressure – work – power – energy – types – law of conservation of energy – thermodynamic system – types – thermodynamic equilibrium – properties of systems – intensive and extensive properties – State of System – process – cycle – point and path functions – zeroth, first and second laws of thermodynamics.</p> <p>Perfect gases: - laws of perfect gases – Boyle's, Charle's, Joule's, Regnault's and Avogadro's laws – General Gas Equation – Characteristic gas equation – relation between specific heats and gas constant – Universal gas constant – Change in Internal Energy- enthalpy – change in enthalpy – entropy</p> <p>Thermodynamic processes:- Constant volume, Constant pressure, Constant temp.(isothermal) ,Isentropic (reversible adiabatic) and, Polytropic Processes – p-V and T-s diagrams, work done , change in internal energy , heat transfer , change in enthalpy, change in entropy for above processes – Simple problems – hyperbolic ,Free expansion and throttling processes(Description only) .</p> <p>Steady flow system: – control volume – steady flow energy equation – assumptions – Engineering applications</p>	1 - 55
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HIGH VOLTAGE ENGINEERING

INTRODUCTION

Generation and transmission of electric energy -Voltage stresses -Testing voltages -Testing with power frequency voltages -

Testing with lightning impulse voltages -Testing with switching impulses -D.C. voltages -Testing with very low frequency voltage

BREAKDOWN OF GASEOUS INSULATION

Ionisation of Gases -Ionisation processes in gas discharges- Relevant gas ionisation processes- Breakdown Characteristic in gases- Electron Avalanche Mechanism (Townsend Breakdown Process) - Paschen's Law - Streamer Mechanism -Factors affecting the breakdown voltage a Vacuum gap -Time lags of Spark breakdown -Corona Discharges

INSULATION CO-ORDINATION

Insulation Co-ordination-Terminology -Conventional method of insulation co-ordination - Statistical Method of Insulation Co-ordination - Length of Overhead Shielding Wire- Surge Protection

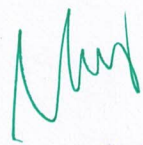
HIGH VOLTAGE TRANSIENT ANALYSIS

Surges on Transmission Lines - Surge Impedance and Velocity of Propagation- Energy stored in surge- Reflection of Travelling waves at a Junction- Open circuited line fed from a infinite source - Short Circuit Line fed from an infinite source- Bewley Lattice Diagram -Analysis of an open-circuit linefed from ideal source -Reflections at 3 substation system

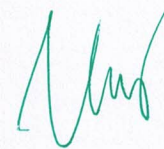
-Reflection and Transmission at a T-junction-Bergeron's Method of Graphical Solution-Representation of Lumped Elements in travelling wave techniques- Branch Time Table for digital computer implementation - Transform Methods of solving Transients

MEASUREMENT OF HIGH VOLTAGES

Peak voltage measurements by spark gaps-Sphere gaps, Reference measuring systems, Uniform field gaps ,Rod gaps -Electrostatic voltmeters-Ammeter in series with high ohmic resistors and high ohmic resistor voltage dividers - Generating voltmeters and field sensors -The measurement of peak voltages -The


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Chubb–Fortescue method, Voltage dividers and passive rectifier circuits , Active peak-reading circuits, High-voltage capacitors for measuring circuits, Voltage dividing systems and impulse voltage measurements ,Generalized voltage generation and measuring circuit, Demands upon transfer characteristics of the measuring system, Fundamentals for the computation of the measuring system Voltage dividers Interaction between voltage divider and its lead ,The divider's low-voltage arm- Fast digital transient recorders for impulse measurements, Principles and historical development of transient digital recorders Errors inherent in digital recorders-Specification of ideal A/D recorder and parameters required for h.v-impulse testing -Future trends



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MULTIMEDIA SYSTEMS DESIGN

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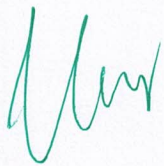
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PYTHON PROGRAMMING

FIRST EDITION

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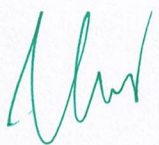
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PREFACE

This book is designed for use in courses on Python Programming at the undergraduate/postgraduate level, particularly designed for the structured curriculum of Bachelor of Technology and Bachelor of Engineering – Computer science & Engineering

Although the contents of the book follows the essential content of complete concepts of python programming is sufficiently broad in scope and rigorous in coverage to satisfy any undergraduate and postgraduate requirements in the field of IT/CSE.

The book is organized into five sections:

Section 1, describes about the basics of python programming which covers the variables, identifiers, arithmetic operator, values & type, python statement, operator, operator precedence, expressions & statements, functions etc.,

Section 2, covers the data types in python, list, characteristics, string, python dictionary, modules, scope of variables, packages, libraries etc.,

Section 3, delivers the file handling & exception handling, data files in python, file operation, file methods & python exception handling etc.,

Section 4, covers about the python modules, listing of modules, variables in a modules, modules loading & execution, frameworks in python etc.,

Section 5, includes the object oriented programming in python, oop concept, class, inheritance, polymorphism, encapsulation, overriding methods, constructor and abstraction in python etc.,

The analyses and discussion, covering these five sections in the various chapters of this book, are based on the readings recommended for this course. However, wherever required, we have supplemented from other sources reference. A select bibliography is given at the end of the book for reference to the authors cited in the text

I hope this thoroughly book on Python Programming will prove handy and useful to students and teachers on the same.



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SYLLABUS

PYTHON PROGRAMMING

COURSE OBJECTIVES

- To develop Python programs with conditionals, loops and functions.
- To use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python
- To use modules, packages and frameworks in python
- To define a class with attributes and methods in python

CHAPTER 1

BASICS OF PYTHON

Introduction to Python Programming – Python Interpreter and Interactive Mode– Variables and Identifiers – Arithmetic Operators – Values and Types – Statements. Operators – Boolean Values – Operator Precedence – Expression – Conditionals: If-Else Constructs – Loop Structures/Iterative Statements – While Loop – For Loop – Break Statement-Continue statement – Function Call and Returning Values – Parameter Passing – Local and Global Scope – Recursive Functions

CHAPTER 2

DATA TYPES IN PYTHON

Lists, Tuples, Sets, Strings, Dictionary, Modules: Module Loading and Execution – Packages – Making Your Own Module – The Python Standard Libraries.

CHAPTER 3

FILE HANDLING AND EXCEPTION HANDLING

Files: Introduction – File Path – Opening and Closing Files – Reading and Writing Files –File Position –Exception: Errors and Exceptions, Exception Handling, Multiple Exceptions

CHAPTER 4

MODULES, PACKAGES AND FRAMEWORKS

Modules: Introduction – Module Loading and Execution – Packages – Making Your Own Module – The Python Libraries for data processing, data mining and visualization- NUMPY, Pandas, Matplotlib, Plotly-Frameworks- -Django, Flask, Web2Py

CHAPTER 5

OBJECT ORIENTED PROGRAMMING IN PYTHON

Creating a Class, Class methods, Class Inheritance, Encapsulation, Polymorphism, class method

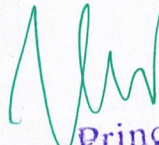
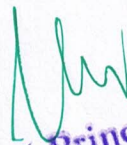

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MACHINE LEARNING

FIRST EDITION

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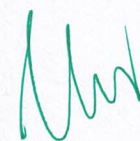
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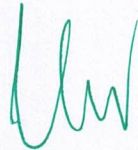
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PREFACE

Machine learning is transforming industries such as healthcare, education, transportation, food, entertainment, and diverse assembly lines, to name a few. It will have an impact on almost every aspect of people's lives, including their houses, transportation, shopping, food ordering, and so on. Because of developments in computer technology, machine learning today is not the same as machine learning in the past. It evolved from pattern recognition and the assumption that computers may learn without being instructed to do specific tasks; artificial intelligence researchers wanted to see if computers could learn from data.

Because models may change autonomously when they are exposed to new data, the iterative feature of machine learning is critical. They use earlier computations to deliver reliable, repeatable assessments and outputs. The same forces that have propelled data mining and Bayesian analysis to unprecedented heights are fueling renewed interest in machine learning. Things like increased data quantity and diversity, less expensive and more powerful computing processing, and low-cost data storage are examples.

This book not only covers the whole scope of the subject, but it also explores its philosophy. This increases knowledge and makes the subject more interesting. Both learners and researchers will find this book incredibly useful.



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UNIT 1 : It focuses on basic of machine learning systems followed by its perceptrons ,neural network ,feed forward neural network , supervised, unsupervised, and semi-supervised machine learning techniques, learning systems, perspectives and issues, and other topics.

UNIT 2: Discuss the decision tree method and identity, as well as how to avoid the overfitting problem, Neural Network Representation, Problems, Perceptron, Multilayer Networks, KNN and Curse of Dimensionality

UNIT 3: Discuss and apply the generative learning algorithm to issues such as the Bayes Theorem, Nave Bayes Classifier, and Logistic regression

UNIT 4: Improve the various types of clustering, K-Nearest Neighbour Learning, EM algorithm, latent semantic indexing

UNIT 5: Analyze and recommend relevant machine learning techniques for a variety of issues, including the Markov decision process, Bellman Equation,and various models.


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SYLLABUS

UNIT 1: INTRODUCTION TO MACHINE LEARNING

Learning Systems – Goals and Applications –Aspects of Developing a Learning Systems- Training Data –Linear Perceptron's as Neurons-Neural Nets – Working

–Layers –Activation Function –Feed Forward Neural Network –Limitations – DBN'S –Deep Learning for Big Data – Local Minima-Rearranging Neurons – Spurious Local Minima –Comparison of AI – Machine Learning and Deep Learning

UNIT II – TYPES OF LEARNING

Supervised Learning –Goals and Applications – Unsupervised Learning –Case Study –Classification –MLP is Practice –Overfitting –Linear and Non Linear Discriminative –Decision Tree –Probabilistic –K –Nearest Neighbour Learning Algorithm –Curse of Dimensionality

UNIT III –LEARNING ALGORITHMS

Logistic Regression –Perceptron's - Generative Learning Algorithm – Gaussian Discrimination Analysis –Naïve Bayes-SVM Kernels – Model Selection – Bagging Boosting –Evaluating And Debugging –Classification

UNIT IV – UNSUPERVISED AND LEARNING ALGORITHMS

Clustering – K-means Clustering –EM Algorithm – Mixture of Gaussian – Factor Analysis – Principal and Independent Component Analysis –Latent Semantic Indexing – Spectral or Sub Space Clustering

UNIT V - REINFORCEMENT LEARNING . IOT AND MACHINE LEARNING

Markov Decision Processes –Bellman Equation –Value Iteration And Policy Iteration –Linear Quadratic Regulation –Q Learning –Policy Versus Value Learning –Pomdps –IoT –Recent Trends –Various Models .Case Study :: Spam Filtering Based On Text Classification


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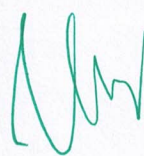
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