



Report Guest-Lecture on
"Role of Optimization Techniques in Electrical Engineering"
Organised by Department of Electrical & Electronics Engineering
Date: 04.11.2023

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(UGC-AUTONOMOUS INSTITUTION)
Madanapalle-517325, Annamaya Dist., Andhra Pradesh

In association with
IEEE and ISTE student chapters

Organized by Department of Electrical and Electronics Engineering
"Role of Optimization Techniques in Electrical Engineering"

Resource person
Dr. Naladi Ram Babu
Assistant Professor, Aditya Engineering College.

Date: 04/11/2023 **Time: 2.00 PM to 3.00 PM**

Chief Patron: Dr. N. Vijaya Bhaskar Choudary, Ph.D., Secretary & Correspondent
Patron: Mrs. Keerthi Nadella, Executive Director
Chief Chair: Dr. C. Yuvaraaj, Principal
Conveners: Dr. Komal Basaha, Vice Principal, Administration; Dr. A. V. Pavan Kumar, HOD EEE, Professor.
Coordinator: Dr. Gumpu Srinivasulu, Assistant Professor, EEE Department.

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Organized in association with: IEEE and ISTE student chapters, MITS Madanapalle.

Submitted by: Dr. Gumpu Srinivasulu, Assistant Professor, Dept. of EEE.

Attendance: 43 students and 3 faculty

The programme is started at 1.00 PM with a welcome address to all the audience by the **Dr. A V Pavan Kumar**, H.O.D, EEE, MITS, Madanapalle. The resource person **Dr. Naladi Ram Babu** Associate Professor, Aditya Engineering college, Surampalem, India, was introduced by **Dr. Gumpu Srinivasulu**, Assistant Professor, Dept. of EEE.

The resource person started the session by extending his hearty thanks to the participants, IEEE ad ISTE coordinators, executive members, HoD, Principal and Management of MITS Madanapalle for giving him opportunity to share his knowledge and experience in **"Role of Optimization Techniques in Electrical Engineering"**.

The resource person highlighted the various types of optimization techniques and their applications in the automatic generation control. Also, he focused on the various challenges in the implementation of AGC in the thermal generation plants.. Besides, the growth in market and opportunities in the power system sector are being discussed during the session. The distinguished speaker discussed various optimization based controllers for AGC. Also, the basic architecture of different controllers are elaborated **Dr. Naladi Ram Babu**. During the session, the major opportunities, power converters and controllers design are being focused by the speaker. Besides, the prominent resource person pointed that there are huge number of opportunities for the engineering graduates in recent decades. Moreover, possibilities and innovations in solar sector are being highlighted during the session. At the end, the prominent speaker underlined the career opportunities for graduates. Also, speaker assured to help the participants/students for any kind of research guidance.

The session was concluded followed by a vote of thanks, given by Dr. Gumpu Srinivasulu, Assistant Professor, Department of EEE (IEEE and ISTE Coordinator) MITS, Madanapalle.



Photos:

The screenshot shows a Zoom meeting interface. The main window displays a presentation slide titled "Why Optimization Techniques are needed?". The slide features a central diagram with "optimization" in a central green circle, connected to five surrounding green circles: "Reduce the cost" (top), "Save the time" (left), "Safety & reduce the error" (right), "reproducibility" (bottom), and "Innovation & efficiency" (bottom-right). The slide also includes the ADITYA logo and the text "Role of Optimization Techniques in Electrical Engineering".

Below the slide, a toolbar shows several participant icons: DB, HOD-EEE, Rohini, Lakshmi Re., Dr Lakshmi, and SG. The "Participants" panel on the right lists the following attendees:

- Share invite
- Saravesh Reddy, U
- SA Sharan Kumar Reddy, A
- Attendees (2):
 - priya (Guest) Meeting guest
 - Rohini, M
- Others from chat (3):
 - Mahesh Babu, P
 - Mani Deepthi, M
 - Kavya, V R

The bottom of the screen shows a slide titled "What is an objective function:" with the following content:

- It is defined as the objective of making decisions.
- It is the act of achieving the best possible result under given circumstances
- It produces the best formulation under a given set of restrictions
- It express the main aim of the model which is either to be minimized or maximized.

(a) Minimization case:
(i) errors such as ISE, ITSE, IAE, ITAE, RMS
(ii) the losses

(b) Maximization case:
(i) revenue
(ii) cost, profits

(c) Design an objective function depending on our work.

Classified as:
(i) single Objective function
(ii) Multi-Objective function



DB Rohini... DK P SD SG

Dr.Naladi Ram ... Rohini... On hold priya (... Sandesh Re... View all

Applications of meta-heuristic techniques in Power Systems:

(ii) Maximization of the revenue, cost, profits

$$NPV = \sum_{t=1}^{T_{max}} \frac{(Cinflow_{it} - Couflow_{it}) - (CRM_t)}{(1+y)^t} - I_{invest}$$

$$Cinflow_{it} = Eev_{it}Ct_{it} + Ee2g_{it}Csale_{it}$$

$$Couflow_{it} = Eg2r_{it}Chov_{it}$$

$$CRM_t = \frac{\sum_{i=1}^{T_{max}} EDstorage_{it}}{ETHstorage} Cstorage_{it} + Cnstorage$$

$$I_{invest} = Ccharge_{it} + Cncharge_{it} + \sum_{i=1}^{T_{max}} (Cv_{it} \Phi_{it} \gamma_{it}) + Cpv_{it} Sp_{it} + Cstorage_{it} ECstorage_{it}$$

Optimal Parameter Allocation in Renewable Integrated Fast Charging EV Station considering hGPS Algorithm

- Decision variables : NPV
- Parameters (data) : Power generating units, EV
- Constraints : Battery, RES power generation
- Performance objective: Maximize the NPV

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DB HOD- EEE Rohini... LK DK SG

Dr.Naladi Ram ... HOD- EEE Rohini... Lakshmi Re... Dr Lakshmi... View all

Constraints:

- The constraints represent functional relationships among the design variables and other design parameters satisfying specific physical phenomena and certain resource limitations.
- The nature and number of constraints included in the formulation depend on the user.
- Constraints may have exact mathematical expressions or not.
- Inequality type constraints. Inequality constraints state that the functional relationships among variables are either greater than, smaller than or equal to, a resource value.
- Equality type constraints: state that functional relationships should exactly match a resource value

Generator	Cost (\$/MWh)	Minimum (MW)	Maximum (MW)
1	$F_1 = 1000 + 120P_1 + 0.01P_1^2$	20	500
2	$F_2 = 3000 + 15P_2 + 0.02P_2^2$	10	250

Gen 1: $F_1(P_1) = 2200 - 25P_1 + 0.025 \times P_1^2$ where $220 \leq P_1 \leq 600$ MW
 Gen 2: $F_2(P_2) = 1500 + 11P_2 + 0.02 \times P_2^2$ where $350 \leq P_2 \leq 800$ MW
 Gen 3: $F_3(P_3) = 1000 + 20P_3 + 0.015 \times P_3^2$ where $150 \leq P_3 \leq 600$

If $\delta(x) = 5$
 Now it is changed to inequality constraints as given below:
 $\delta(x) \geq 4$
 $\delta(x) \leq 6$

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Signature of the Coordinator

Signature of HoD, EEE