SDG 17: PARTNERSHIPS FOR THE GOALS

Indicator 17.2.3 — International Collaboration on Data for the SDGs

Participating in international collaboration on gathering or measuring data for the SDGs



3	2	2	1
internationally connected research outputs, 2025	co-authored with universities abroad	partner countries (Ethiopia, South Africa)	international conference (Uzbekistan)

Centurion University of Technology and Management, Andhra Pradesh (CUTM AP)

Tekkali Village, Nellimarla Mandal, Vizianagaram – 535003, Andhra Pradesh, India

Evidence report for Times Higher Education Impact Rankings · Reporting period: January – December 2025

17.2.3 The Indicator and Our Response

What Times Higher Education asks, and what CUTM AP reports for 2025

Indicator 17.2.3 asks whether the university participates in international collaboration on gathering or measuring data for the Sustainable Development Goals.

In 2025 researchers of Centurion University of Technology and Management, Andhra Pradesh (CUTM AP) worked with colleagues in Ethiopia and South Africa to gather and measure scientific data — the structural and magnetic properties of energy-efficient ferrite materials, and the performance of a new numerical method on test and real-world problems — and presented a review of data-driven approaches to renewable energy at an international conference in Uzbekistan.

No.	Research output (2025)	International partner	SDG relevance	Proof
1	**Assessment of micro-structural and magnetic properties of M0.5Cu0.4Zn0.1Fe2O4 (M = Ni, Co) nanocrystalline ferrites**	Prof. Paulos Taddesse — Department of Physics, College of Natural Science, Arba Minch University, Ethiopia	SDG 7 (energy efficiency) · SDG 9 (innovation in materials)	**Section 1, Annex 1**
2	**The Dynamics and Applications of an Optimal Iterative Method**	Dr Virath Singh — Senior Lecturer of Mathematics, University of KwaZulu-Natal, Durban, South Africa	SDG 9 (scientific research capability) · SDG 3 (applications in medical science)	**Section 2, Annex 2**
3	**Artificial Intelligence in Renewable Energy Systems: Optimizing Efficiency, Sustainability, and Business Management**	Presented at an international conference in Tashkent, Uzbekistan	SDG 7 (affordable and clean energy) · SDG 9 · SDG 12 · SDG 13	**Section 3, Annex 3**

3	2	6	2
research outputs, 2025	universities abroad	CUTM AP researchers involved	partner countries abroad

1 International Co-authored Research

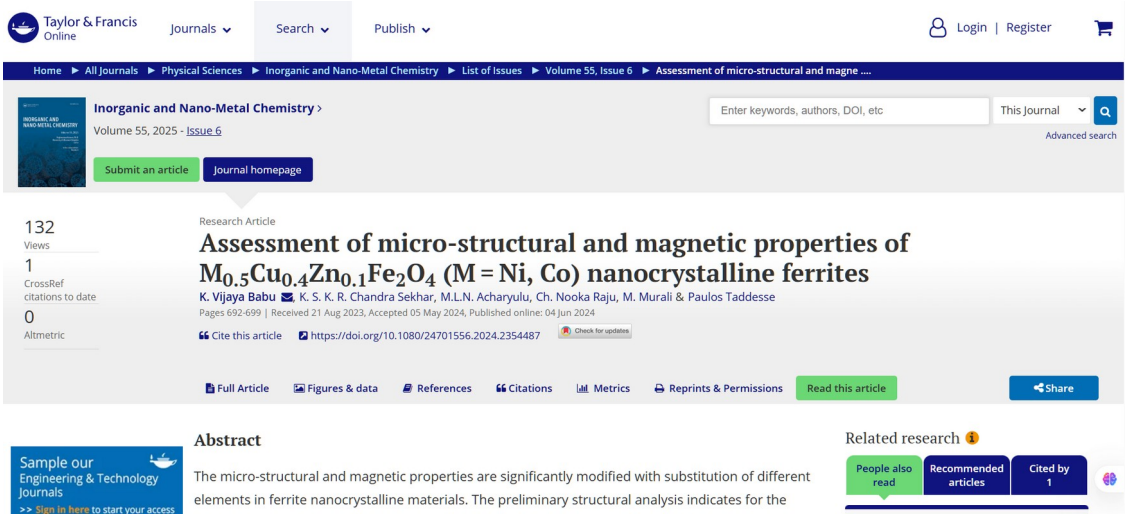
Inorganic and Nano-Metal Chemistry (Taylor & Francis), Vol. 55, Issue 6, 2025, pp. 692–699

Assessment of micro-structural and magnetic properties of M0.5Cu0.4Zn0.1Fe2O4 (M = Ni, Co) nanocrystalline ferrites

Published in	Inorganic and Nano-Metal Chemistry (Taylor & Francis), Vol. 55, Issue 6, 2025, pp. 692–699
Dates	Received 21 Aug 2023 · Accepted 5 May 2024 · Published online 4 Jun 2024 · Issue 6, 2025
DOI	https://doi.org/10.1080/24701556.2024.2354487
Authors	K. Vijaya Babu, K. S. K. R. Chandra Sekhar, M. L. N. Acharyulu, Ch. Nooka Raju, M. Murali, Paulos Taddesse
CUTM AP authors	Dr K. Vijaya Babu (Physics, corresponding author), Dr M. L. N. Acharyulu (Chemistry), Ch. Nooka Raju (Radiology), M. Murali (ECE)
International partner	Prof. Paulos Taddesse — Department of Physics, College of Natural Science, Arba Minch University, Ethiopia
SDG relevance	SDG 7 (energy efficiency) · SDG 9 (innovation in materials)

Data gathered and measured together

The team synthesised nickel- and cobalt-based copper-zinc nanocrystalline ferrites and jointly measured and compared their crystal structure (X-ray diffraction: single-phase cubic spinel, space group Fd-3m) and magnetic properties. Soft ferrites of this kind are used in energy-efficient inductors, transformers and electronic components.



Article page on Taylor & Francis Online showing the title, the six authors, volume 55 (2025) and the DOI. (Annex 1).

2 International Co-authored Research

IAENG International Journal of Applied Mathematics, Vol. 55, Issue 6, June 2025, pp. 1519–1530

The Dynamics and Applications of an Optimal Iterative Method

Published in	IAENG International Journal of Applied Mathematics, Vol. 55, Issue 6, June 2025, pp. 1519–1530
Dates	Received 23 Jul 2024 · Revised 4 Apr 2025 · Issue June 2025
Authors	Mani Sandeep Kumar Mylapalli, Navya Kakarlapudi, Virath Singh, Chaganti Pragathi, Perumali Sundarayya
CUTM AP authors	Navya Kakarlapudi, Assistant Professor of Mathematics, Centurion University of Technology and Management, Vizianagaram
International partner	Dr Virath Singh — Senior Lecturer of Mathematics, University of KwaZulu-Natal, Durban, South Africa
SDG relevance	SDG 9 (scientific research capability) · SDG 3 (applications in medical science)

Data gathered and measured together

The team developed a sixteenth-order optimal iterative method for solving nonlinear equations (efficiency index 1.741), compared it with recent methods of the same order on a set of test functions and real-world problems, and applied it to problems in medical science, physics and chemical engineering.



IAENG International Journal of Applied Mathematics

The Dynamics and Applications of an Optimal Iterative Method

Mani Sandeep Kumar Mylapalli, *Member, IAENG*, Navya Kakarlapudi, Virath Singh, Chaganti Pragathi, Perumali Sundarayya

Volume 55, Issue 6, June 2025, Pages 1519-1530

First page of the published paper showing the authors' affiliations — Centurion University (CUTM AP) and the University of KwaZulu-Natal, South Africa. (Annex 2).

3 International Conference Paper

2025 International Conference on Technology Enabled Economic Changes (InTech 2025), Tashkent, Uzbekistan, 27–28 Feb 2025 — IEEE Xplore

Artificial Intelligence in Renewable Energy Systems: Optimizing Efficiency, Sustainability, and Business Management

Published in	2025 International Conference on Technology Enabled Economic Changes (InTech 2025), Tashkent, Uzbekistan, 27–28 Feb 2025 — IEEE Xplore
Dates	Presented 27–28 Feb 2025 · Published in IEEE Xplore
Authors	Sudheer Choudari, R. Ramakrishna, P. Malathi, J. Venkatagiri, Saket Rusia, Syed Azazul Haque
CUTM AP authors	Sudheer Choudari, Centurion University of Technology and Management
International partner	Presented at an international conference in Tashkent, Uzbekistan
SDG relevance	SDG 7 (affordable and clean energy) · SDG 9 · SDG 12 · SDG 13

Data gathered and measured together

The paper reviews studies published between 2007 and 2025 on the use of artificial intelligence in renewable energy systems, comparing approaches such as predictive maintenance, demand forecasting and deep-learning models, and sets out how they improve reliability, energy-conversion efficiency and sustainable business management.



Paper page on IEEE Xplore showing the title, authors and the 2025 international conference. (Annex 3).

✔ Summary of Evidence

Indicator 17.2.3 — Centurion University of Technology and Management, Andhra Pradesh, 2025

Research output	International collaboration
1. Assessment of micro-structural and magnetic properties of M0.5Cu0.4Z...	Prof. Paulos Taddesse — Department of Physics, College of Natural Science, Arba Minch University, Ethiopia. Inorganic and Nano-Metal Chemistry (Taylor & Francis), Vol. 55, Issue 6, 2025, pp. 692–699.
2. The Dynamics and Applications of an Optimal Iterative Method	Dr Virath Singh — Senior Lecturer of Mathematics, University of KwaZulu-Natal, Durban, South Africa. IAENG International Journal of Applied Mathematics, Vol. 55, Issue 6, June 2025, pp. 1519–1530.
3. Artificial Intelligence in Renewable Energy Systems: Optimizing Effi...	Presented at an international conference in Tashkent, Uzbekistan. 2025 International Conference on Technology Enabled Economic Changes (InTech 2025), Tashkent, Uzbekistan, 27–28 Feb 2025 — IEEE Xplore.

HOW THIS MEETS INDICATOR 17.2.3

CUTM AP researchers took part in international research collaborations that gathered and measured scientific data relevant to energy efficiency and innovation (SDG 7, SDG 9), with partners in Ethiopia and South Africa.

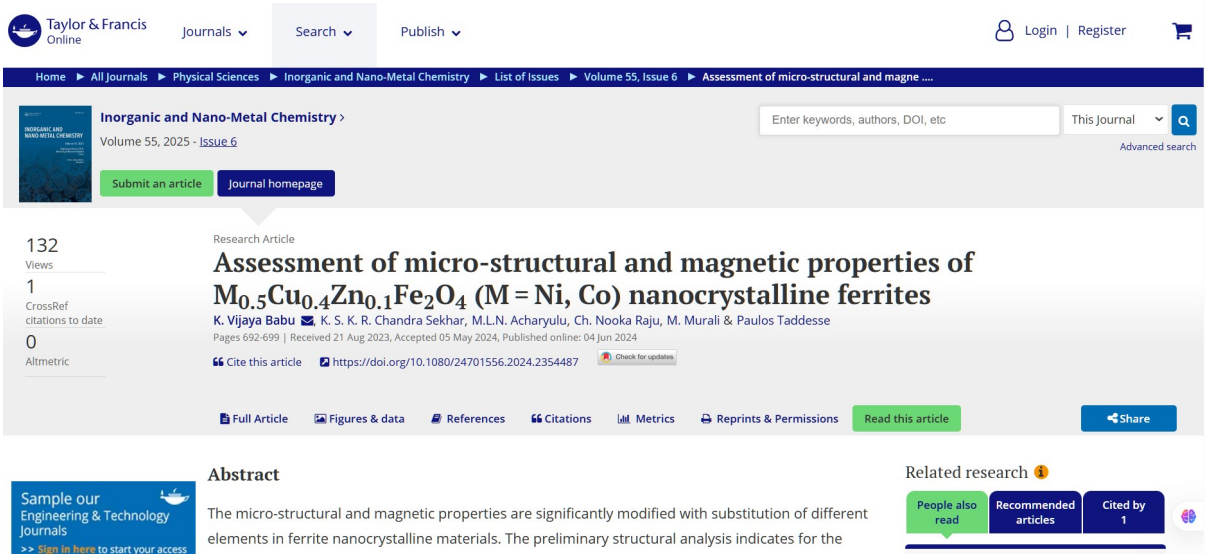
ANNEXURES

Proof of publication and authorship

Annex 1

Assessment of micro-structural and magnetic properties of M0.5Cu0.4Zn0.1Fe2O4 (M = Ni, Co) nanocrystalline ferrites

Inorganic and Nano-Metal Chemistry (Taylor & Francis), Vol. 55, Issue 6, 2025, pp. 692–699



Annex 2

The Dynamics and Applications of an Optimal Iterative Method

IAENG International Journal of Applied Mathematics, Vol. 55, Issue 6, June 2025, pp. 1519–1530

IAENG International Journal of Applied Mathematics

The Dynamics and Applications of an Optimal Iterative Method

Mani Sandeep Kumar Mylapalli, *Member, IAENG*, Navya Kakarlapudi, Virath Singh, Chaganti Pragathi, Perumali Sundarayya

***Abstract*— In this paper, we develop a sixteenth-order iterative scheme to compute the zero of the nonlinear equation in four steps, using five functional evaluations, and achieve optimality with an efficiency index of 1.741. We also discuss the theoretical convergence analysis of the approach and compare the proposed technique with recent methods of equal order regarding successive errors, number of iterations, and functional evaluations by taking several algebraical, and transcendental test functions. The developed method is put into practice in applications in the fields of medical sciences, physics, and chemical engineering. Various approaches are analyzed using basins of attraction to show taking polynomials as test functions in a complex plane.**

***Index Terms*— Nonlinear Equation, Optimal order, Efficiency Index, Order of Convergence, Iterative Method, Functional Evaluations, Basins of Attraction.**

I. Introduction

SOLVING nonlinear equations are among the most critical challenges in scientific and technical applications. Nonlinear equations can be used to solve several optimization challenges in various applications. Computing their roots in a finite number of arithmetic operations is generally tricky. A subfield of computer science and mathematics known as numerical analysis creates evaluates and applies algorithms to resolve numerical issues. This work is about iterative approaches for finding a simple root x, i.e., $h(x)=0$. The most well-known and frequently applied methodology for resolving nonlinear equations is Newton Rahson's method (NR) [2] and its efficiency index is $\sqrt{2}=1.414$. It is given by,

$$x_{n+1}=x_n-\frac{h(x_n)}{h'(x_n)},\qquad n=0,1,2,\ldots \tag{1}$$

This employs a one-step iterative procedure. Newton's method has a quadratic order of convergence to get a simple zero.

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Mani Sandeep Kumar Mylapalli is an Assistant Professor of Mathematics, GITAM School of Science, GITAM (Deemed to be University), Visakhapatnam 530040, INDIA (corresponding author phone: +91 6303106197; e-mail: mmylapal@gitam.edu).
Navya Kakarlapudi is an Assistant Professor of Mathematics, Centurion University of Technology and Management, Vizianagaram 535003, INDIA (e-mail: kakarlapudinavya@gmail.com).
Virath Sewnath Singh is a Senior Lecturer of Mathematics, University of KwaZulu Natal, Durban 4000, South Africa (e-mail: singhv@ukzn.ac.za).
Pragathi Chaganti is an Associate Professor of Mathematics, Gitam Institute of Science, GITAM (Deemed to be University), Visakhapatnam 530040, INDIA (e-mail: pchaganti@gitam.edu).
Perumali Sundarayya is an Associate Professor of Mathematics, Gitam Institute of Science, GITAM (Deemed to be University), Visakhapatnam 530040, INDIA (e-mail: sperumal@gitam.edu).

This work aims to build an effective derivative-free technique for solving nonlinear equations. We developed a new optimal iterative approach to bolster the hypothesis. Based on N functional assessments, Kung-Traub hypothesized that multipoint iteration techniques may attain an optimal convergence order $2N-1$.

This study uses the weight function methodology to build a sixteenth-order iterative method. To improve the iterative method presented, we consider the finite difference approximation and use the approximants of the higher derivatives to avoid computing the high-order derivatives of the function. To evaluate the performance of the new strategy against the current equal-order methods considering a few test functions and real-world application problems. We also studied the dynamic performance of our developed method. The basins of attraction are also shown and contrasted with the other methods of the same order at the study's conclusion.

Some of the existing methods developed recently for solving nonlinear equations are given below:

In the year 2020, an optimal sixteenth-order iterative method (DM) is presented by Dejan Cebic [1] with five functional evaluations and is given as

$$\begin{aligned}
y_n &= x_n-\frac{h(x_n)}{h'(x_n)}\\
z_n &= y_n-\left(3-\frac{2h[y_n,x_n]}{h'(x_n)}\right)\frac{h(y_n)}{h'(x_n)}\\
w_n &= z_n-\frac{h(z_n)}{h'(x_n)}\frac{h'(x_n)-h[y_n,x_n]+h[z_n,y_n]}{2h[z_n,y_n]-h[z_n,x_n]}\\
x_{n+1} &= w_n-\frac{h(w_n)\left(2h[z_n,x_n]-2h[w_n,x_n]+h[w_n,z_n]\right)}{h'(x_n)\left(h[w_n,y_n]-h[z_n,y_n]\right)+h^2[z_n,x_n]-h^2[w_n,x_n]+h^2[w_n,z_n]}
\end{aligned} \tag{2}$$

In the year 2017, A new sixteenth-order optimal iterative method (RM) developed by Rafiullah et al. [4] with six functional evaluations is as follows:

$$\begin{aligned}
y_n &= x_n-\frac{h(x_n)}{h'(x_n)}\\
z_n &= y_n-\frac{h(y_n)}{h'(y_n)}-\frac{\left(h(y_n)\right)^2\left(h'(x_n)-h'(y_n)\right)}{2\left(h(x_n)-h(y_n)\right)\left(h'(x_n)\right)^2}\\
w_n &= z_n-\frac{h(z_n)\left(\left(x_n-y_n\right)\left(x_n-z_n\right)\left(y_n-z_n\right)\right)}{\left(-h(z_n)(x_n-y_n)(x_n-2z_n+y_n)+h(y_n)(x_n-z_n)^2-h(x_n)(y_n-z_n)^2\right)}\\
x_{n+1} &= w_n-\frac{h(w_n)}{h'(w_n)}
\end{aligned} \tag{3}$$

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Annex 3

Artificial Intelligence in Renewable Energy Systems: Optimizing Efficiency, Sustainability, and Business Management

2025 International Conference on Technology Enabled Economic Changes (InTech 2025), Tashkent, Uzbekistan, 27–28 Feb 2025 — IEEE Xplore

