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# Дружественный интерфейс

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- Удобный ПОИСК** (Convenient SEARCH) pointing to the search bar.
- Легкий доступ к основным периодическим изданиям на нашей домашней странице** (Easy access to main periodicals on our home page) pointing to the 'SPECIALIZED COLLECTIONS' section.
- Возможность просмотра предстоящих публикаций** (Ability to view upcoming publications) pointing to the 'Forthcoming titles' section.

The website features a navigation menu with 'PUBLICATION', 'SUPPLEMENTS', 'ABOUT US', and 'CONTACT US'. A search bar is located below the logo. The main content area displays 'SPECIALIZED COLLECTIONS: Supercapacitors' with a book cover image. Below this is a 'Forthcoming titles' section featuring 'Semiconductors: Silicon Carbide and Related Materials' with a book cover and a description.

**Semiconductors: Silicon Carbide and Related Materials**

Editors: Min Lu  
Coming in: May 2019  
Periodical and volume: Materials Science Forum Vol. 954

Description: The Asia-Pacific Conference on Silicon Carbide and Related Materials (APCSCRM 2018) was held on July 9-12, 2018 in Beijing, China. This collection compiled by results of this conference and reflect new developments in the areas of wide bandgap semiconductors (SiC, GaN, Ga<sub>2</sub>O<sub>3</sub>, and etc.) and their device fabrication, including advances in the bulk and epitaxial growth, material structure and property, photoelectron and electronic device. We hope that this edition will be interesting and useful for many specialists

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# Выбор тома

The screenshot shows the website interface for 'Advanced Engineering Forum'. The left sidebar lists various journals under 'Periodicals' and 'Materials Science'. The main content area displays a list of volumes with search and pagination options. Two blue callout boxes provide additional information:

- Простая и быстрая навигация по периодике** (Simple and fast navigation by periodicals) - points to the sidebar.
- Удобный просмотр изданий, опубликованных в периодических изданиях** (Convenient viewing of issues published in periodicals) - points to the volume list.

Volume	Page Count
<b>Advanced Engineering Forum Vol. 32</b> Online since: April 2019 Description: The 32nd volume of the journal "Advanced Engineering Forum" includes peer-reviewed <a href="#">...more</a>	32
<b>Advanced Engineering Forum Vol. 31</b> Online since: February 2019 Description: The 31st volume of the journal "Advanced Engineering Forum" contains peer-reviewed manuscripts describing the results of engineering solutions and research dealing with <a href="#">...more</a>	31
<b>Advanced Engineering Forum Vol. 30</b> Online since: November 2018 Description: The 30th volume of the journal "Advanced Engineering Forum" is collected from peer-reviewed manuscripts describing the results of engineering solutions and research dealing <a href="#">...more</a>	30
<b>Advanced Engineering Forum Vol. 29</b> Online since: August 2018 Description: The 29th volume of the journal "Advanced Engineering Forum" was collected from peer-reviewed manuscripts describing the results of engineering solutions and research dealing <a href="#">...more</a>	29

# Выбор статьи

The screenshot shows the website interface for 'Advanced Engineering Forum Vol. 32'. On the left, a sidebar lists 'Main Themes' from Vol. 23 to Vol. 32. The main content area displays the journal title and a list of articles. A blue callout bubble points to the sidebar with the text 'Список статей, опубликованных в журнале'. Another blue callout bubble points to the article list with the text 'Навигация по статьям'. The article list includes titles, authors, abstracts, and page numbers.

Список статей, опубликованных в журнале

Навигация по статьям

Paper Title	Page
<b><u>An Explicit Solution to Continuum Compliant Cantilever Beam Problem with Various Variational Iteration Algorithms</u></b> Authors: Theddeus T. Akano Abstract: The geometric nonlinearity resulting from large deformation of compliant members has continued to be an interesting research topic in nonlinear mechanics. In ...more	1
<b><u>Finite Element Analysis to Verify the Structural Integrity of an Aeronautical Gas Turbine Disc Made from Inconel 713LC Superalloy</u></b> Authors: Alexandre Domingos Sarti Leme, Geraldo Creci, Edilson Rosa Barbosa de Jesus, Túlio César Rodrigues, João Carlos Menezes Abstract: Gas turbines are very important because they can be used in several areas, such as aeronautics and electric power generation systems. The operation of a gas ...more	15
<b><u>Impact Mechanics of Football Helmet with Various Shell Liner Configurations</u></b> Authors: Theddeus T. Akano, Omotayo Abayomi Fakinlede Abstract: The structure of the skull reveals that the cranial is made up of a number of bones. These bones, except the temporomandibular joint, are joined by sutures. The ...more	27

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# Страница статьи

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**Paper Titles**

- An Explicit Solution to Continuum Compliant Cantilever Beam Problem with Various Variational Iteration Algorithms p.1
- Finite Element Analysis to Verify the Structural Integrity of an Aeronautical Gas Turbine Disc Made from Inconel 713LC Superalloy p.15
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**An Explicit Solution to Continuum Compliant Cantilever Beam Problem with Various Variational Iteration Algorithms**

Abstract:

The geometric nonlinearity resulting from large deformation of compliant members has continued to be an interesting research topic in nonlinear mechanics. In this study, two standard variational iteration algorithms, VIM-I and VIM-III are employed to investigate the large deformation of the continuum compliant beam under point load. The VIM is an efficient technique that bypasses the linearization process and proffers solutions to nonlinear problems. The horizontal and vertical displacements of the continuum compliant cantilever beam free end are expressed in explicit analytical forms. Numerical experiment and simulations were carried out to validate the efficacy and applicability of the semi-analytical method. The VIM-I was split into two; VIM-I(A) and VIM-I(B), with the difference being the initial approximations. The results from the VIM-I(A), VIM-I(B) and VIM-III algorithms were compared with the experimental and exact solution. The outcomes reveal that both algorithms correlated well with the analytical solution and experimental result.

**Info:**

Periodical: [Advanced Engineering Forum \(Volume 32\)](#)

Main Theme: [Advanced Engineering Forum Vol. 32](#)

Pages: 1-13

DOI: <https://doi.org/10.4028/www.scientific.net/AEF.32.1>

Citation: T. T. Akano, "An Explicit Solution to Continuum Compliant Cantilever Beam Problem with Various Variational Iteration Algorithms", *Advanced Engineering Forum*, Vol. 32, pp. 1-13, 2019

Online since: April 2019

Authors: [✉ Theddeus T. Akano \\*](#)

# Страница предварительного просмотра

The screenshot shows a web browser window with the URL <https://www.scientific.net/AEF.32.1>. The page features a dark header with the Scientific.Net logo and navigation links. A central 'Article Preview' window is open, displaying the following information:

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ISSN: 2254-991X, Vol. 32, pp. 1-13  
doi:10.4028/www.scientific.net/AEF.32.1  
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Submitted: 2019-03-09  
Revised: 2019-03-13  
Accepted: 2019-03-14  
Online: 2019-04-19

**An Explicit Solution to Continuum Compliant Cantilever Beam Problem with Various Variational Iteration Algorithms**  
AKANO Theddeus<sup>1\*</sup>  
<sup>1</sup>Department of Systems Engineering, University of Lagos, Akoka, 101017, Lagos, Nigeria  
\*takano@unilag.edu.ng

**Keywords:** geometric nonlinearity; compliant mechanism; variational iteration algorithms; continuum mechanics; large deformation

**Abstract.** The geometric nonlinearity resulting from large deformation of compliant members has continued to be an interesting research topic in nonlinear mechanics. In this study, two standard variational iteration algorithms, VIM-I and VIM-III are employed to investigate the large deformation of the continuum compliant beam under point load. The VIM is an efficient technique that bypasses the linearization process and proffers solutions to nonlinear problems. The horizontal and vertical displacements of the continuum compliant cantilever beam free end are expressed in explicit analytical forms. Numerical experiment and simulations were carried out to validate the efficacy and applicability of the semi-analytical method. The VIM-I was split into two; VIM-I(A) and VIM-I(B), with the difference being the initial approximations. The results from the VIM-I(A), VIM-I(B) and VIM-III algorithms were compared with the experimental and exact solution. The outcomes reveal that both algorithms correlated well with the analytical solution and experimental result.

**Introduction**

The compliant mechanism (CM) gains some or all its motion from the deformation of slender segments rather than from relative motion the rigid-body links and joints [1]. Despite the comparative advantage of CMs over their rigid body counterparts, their design is complicated by the flexible members. The study of geometric nonlinearities introduced by the large deformation in elastic beams has been a centre of focus for various researchers over time [2]-[4]. In these applications, the curvature is nonlinear, resulting from material and geometry. A nonlinear mathematical model is required to capture the material and geometrical nonlinearities resulting from nonlinear deflection. As such, analytical approaches are difficult to determine the solution of the resulting formulation. Hence numerical and semi-analytical approximate methods should be employed.

A few studies have investigated the nonlinear deformation of beams [2]-[4]. Attempts by direct analytical procedure, mainly through elliptic integrals [5]-[7] are too difficult to handle. Perturbation method [8] has been a notable method in a solution of nonlinear equations. But, the method is based on the existence of a small parameter that makes it difficult to develop the technique for diverse applications. A number of the earlier works were focused on the development of numerical algorithms [9]-[12] to tackle this nonlinear problem. However, the laborious computational involvement of these methods has deterred researchers from using them. Recently, some approximate analytical solutions are proposed, such as, Adomian decomposition method (ADM) [11][13][14], homotopy analysis method (HAM) [4][15][16], homotopy perturbation method (HPM) [15], [17]-[22], Chebyshev's polynomial approximation method [23] and differential transform method (DTM) [24]-[27]. The present study aim at exploring the various algorithms of variational iteration method (VIM) in the solution the nonlinear differential equation resulting from the large deformation of a continuum compliant cantilever beam under point load at the free.

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Forum, Vol. 32, pp. 1-13, 2019



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