

THIRD EDITION

# Linear System Theory and Design

Chi-Tsong Chen

# Linear System Theory And Design 4th Edition

**A Loxley**



## **Linear System Theory And Design 4th Edition:**

*Linear System Theory and Design* Chi-Tsong Chen, 1984 With the advancement of technology engineers need the systems they design not only to work but to be the absolute best possible given the requirements and available tools In this environment an understanding of a system's limitations acquires added importance Without such knowledge one might unknowingly attempt to design an impossible system Thus a thorough investigation of all of a system's properties is essential In fact many design procedures have evolved from such investigations For use at the senior graduate level in courses on linear systems and multivariable system design this highly successful text is devoted to this study and the design procedures developed thereof It is not a control text per se since it does not cover performance criteria physical constraints cost optimization and sensitivity problems Chen develops major results and design procedures using simple and efficient methods Thus the presentation is not exhaustive only those concepts which are essential in the development are introduced Problem sets following each chapter help students understand and utilize the concepts and results covered

**Elements of Electromagnetics** Matthew N. O. Sadiku, Sudarshan Nelatury, 2020-07-27 Using a vectors first approach *Elements of Electromagnetics* Seventh Edition covers electrostatics magnetostatics fields waves and applications like transmission lines waveguides and antennas The text also provides a balanced presentation of time varying and static fields preparing students for employment in today's industrial and manufacturing sectors

**Elements of Power Electronics** Philip T. Krein, 2015 *Elements of Power Electronics* features a unifying framework that includes the physical implications of circuit laws switching circuit analysis and the basis for converter operation and control It discusses dc/dc ac/dc dc/ac and ac/ac conversion tasks and principles of resonant converters and discontinuous converters The text also addresses magnetic device design thermal management and drivers for power semiconductors control system aspects of converters and both small signal and geometric controls Models for real devices and components including capacitors inductors wire connections and power semiconductors are developed in depth while newly expanded examples show students how to use tools like Mathcad Matlab and Mathematica to aid in the analysis and design of conversion circuits

*Solutions Manual for "Linear System Theory and Design, Third Edition"* Chi-Tsong Chen, 1998-08-01 This Solutions Manual is designed to accompany *Linear System Theory and Design Third Edition* by C T Chen and includes fully worked out solutions to problems in the main text It is available free to adopters of the text

**Linear System Theory and Design, Third Edition, International Edition** Chi-Tsong Chen, 2009-04-30 An extensive revision of the author's highly successful text this third edition of *Linear System Theory and Design* has been made more accessible to students from all related backgrounds After introducing the fundamental properties of linear systems the text discusses design using state equations and transfer functions In state space design Lyapunov equations are used extensively to design state feedback and state estimators In the discussion of transfer function design pole placement model matching and their applications in tracking and disturbance rejection are covered Both one and

two degree of freedom configurations are used All designs can be accomplished by solving sets of linear algebraic equations The two main objectives of the text are to 1 use simple and efficient methods to develop results and design procedures 2 enable students to employ the results to carry out design All results in this new edition are developed for numerical computation and illustrated using MATLAB with an emphasis on the ideas behind the computation and interpretation of results This book develops all theorems and results in a logical way so that readers can gain an intuitive understanding of the theorems This revised edition begins with the time invariant case and extends through the time varying case It also starts with single input single output design and extends to multi input multi output design Striking a balance between theory and applications Linear System Theory and Design 3 e is ideal for use in advanced undergraduate first year graduate courses in linear systems and multivariable system design in electrical mechanical chemical and aeronautical engineering departments It assumes a working knowledge of linear algebra and the Laplace transform and an elementary knowledge of differential equations *Analog and Digital Control System Design* Chi-Tsong Chen,2006-02-24 This text s contemporary approach focuses on the concepts of linear control systems rather than computational mechanics Straightforward coverage includes an integrated treatment of both classical and modern control system methods The text emphasizes design with discussions of problem formulation design criteria physical constraints several design methods and implementation of compensators Discussions of topics not found in other texts such as pole placement model matching and robust tracking add to the text s cutting edge presentation Students will appreciate the applications and discussions of practical aspects including the leading problem in developing block diagrams noise disturbances and plant perturbations State feedback and state estimators are designed using state variable equations and transfer functions offering a comparison of the two approaches The incorporation of MATLAB throughout the text helps students to avoid time consuming computation and concentrate on control system design and analysis **McGraw-Hill encyclopedia of science & technology** McGraw-Hill,2002

*Modern Control Engineering* P.N. Paraskevopoulos,2017-12-19 Illustrates the analysis behavior and design of linear control systems using classical modern and advanced control techniques Covers recent methods in system identification and optimal digital adaptive robust and fuzzy control as well as stability controllability observability pole placement state observers input output decoupling and model matching **Linear and Reconfigurable Control of Wing Damaged Aircraft** Pascal Nespeca,2009 **Fundamentals of Linear State Space Systems** John S. Bay,1999 Spans a broad range of linear system theory concepts but does so in a complete and sequential style It is suitable for a first year graduate or advanced undergraduate course in any field of engineering State space methods are derived from first principles while drawing on the students previous understanding of physical and mathematical concepts The text requires only a knowledge of basic signals and systems theory but takes the student in a single semester all the way through state feedback observers Kalman filters and elementary I Q G control *Control Theory Applications for Dynamic Production Systems* Neil A.

Duffie,2022-05-23 Control Theory Applications for Dynamic Production Systems Apply the fundamental tools of linear control theory to model analyze design and understand the behavior of dynamic production systems In Control Theory Applications for Dynamic Production Systems Time and Frequency Methods for Analysis and Design distinguished manufacturing engineer Dr Neil A Duffie delivers a comprehensive explanation of how core concepts of control theoretical analysis and design can be applied to production systems Time based perspectives on response to turbulence are augmented by frequency based perspectives fostering new understanding and guiding design of decision making The time delays intrinsic to decision making and decision implementation in production systems are addressed throughout Readers will discover methods for calculating time response and frequency response modeling using transfer functions assessing stability and design of decision making for closed loop production systems The author has included real world examples emphasizing the different components of production systems and illustrating how practical results can be quickly obtained using straightforward Matlab programs which can easily be translated to other platforms Avoiding unnecessary theoretical jargon this book fosters an in depth understanding of key tools of control system engineering It offers A thorough introduction to core control theoretical concepts of analysis and design of dynamic production systems Comprehensive and integrated explorations of continuous time and discrete time models of production systems employing transfer functions and block diagrams Practical discussions of time response frequency response fundamental dynamic behavior closed loop production systems and the design of decision making In depth examples of the analysis and design of complex dynamic behavior requiring approaches such as matrices of transfer functions and modeling of multiple sampling rates Perfect for production manufacturing industrial and control system engineers Control Theory Applications for Dynamic Production Systems will also earn a place in the libraries of students taking advanced courses on industrial system digitalization dynamics and design Modern Control Systems

Richard C. Dorf,Robert H. Bishop,2005 Written to be equally useful for all engineering disciplines this book is organized around the concept of control systems theory as it has been developed in the frequency and time domains It provides coverage of classical control employing root locus design frequency and response design using Bode and Nyquist plots It also covers modern control methods based on state variable models including pole placement design techniques with full state feedback controllers and full state observers The book covers several important topics including robust control systems and system sensitivity state variable models controllability and observability computer control systems internal model control robust PID controllers and computer aided design and analysis For all types of engineers who are interested in a solid introduction to control systems *Computer Arithmetic* Behrooz Parhami,2010 Ideal for graduate and senior undergraduate courses in computer arithmetic and advanced digital design Computer Arithmetic Algorithms and Hardware Designs Second Edition provides a balanced comprehensive treatment of computer arithmetic It covers topics in arithmetic unit design and circuit implementation that complement the architectural and algorithmic speedup techniques used in high performance

computer architecture and parallel processing Using a unified and consistent framework the text begins with number representation and proceeds through basic arithmetic operations floating point arithmetic and function evaluation methods Later chapters cover broad design and implementation topics including techniques for high throughput low power fault tolerant and reconfigurable arithmetic An appendix provides a historical view of the field and speculates on its future An indispensable resource for instruction professional development and research **Computer Arithmetic Algorithms and Hardware Designs** Second Edition combines broad coverage of the underlying theories of computer arithmetic with numerous examples of practical designs worked out examples and a large collection of meaningful problems This second edition includes a new chapter on reconfigurable arithmetic in order to address the fact that arithmetic functions are increasingly being implemented on field programmable gate arrays FPGAs and FPGA like configurable devices Updated and thoroughly revised the book offers new and expanded coverage of saturating adders and multipliers truncated multipliers fused multiply add units overlapped quotient digit selection bipartite and multipartite tables reversible logic dot notation modular arithmetic Montgomery modular reduction division by constants IEEE floating point standard formats and interval arithmetic *The Cumulative Book Index* ,1999 **Control Theory and Advanced Technology** ,1993 **Electric Machinery and Transformers** Bhag S. Guru,2001 This text is designed for courses in electrical engineering It discusses the principles behind building the primary infrastructure for the generation of electricity that supplies the energy needs of people throughout the world **Anti-windup Integral Action Controller Design for Linear Systems with Input Saturations** Ahmet Naci Mete,2004 [Subject Guide to Books in Print](#) ,2001 **Books in Print** ,1991 [CERN](#). Institut de recherches subatomiques de Strasbourg,2008

Ignite the flame of optimism with is motivational masterpiece, Fuel Your Spirit with **Linear System Theory And Design 4th Edition** . In a downloadable PDF format ( Download in PDF: \*), this ebook is a beacon of encouragement. Download now and let the words propel you towards a brighter, more motivated tomorrow.

[https://matrix.jamesarcher.co/public/publication/fetch.php/mcgraw\\_hill\\_companies\\_guided\\_activities\\_answers.pdf](https://matrix.jamesarcher.co/public/publication/fetch.php/mcgraw_hill_companies_guided_activities_answers.pdf)

## **Table of Contents Linear System Theory And Design 4th Edition**

1. Understanding the eBook Linear System Theory And Design 4th Edition
  - The Rise of Digital Reading Linear System Theory And Design 4th Edition
  - Advantages of eBooks Over Traditional Books
2. Identifying Linear System Theory And Design 4th Edition
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Linear System Theory And Design 4th Edition
  - User-Friendly Interface
4. Exploring eBook Recommendations from Linear System Theory And Design 4th Edition
  - Personalized Recommendations
  - Linear System Theory And Design 4th Edition User Reviews and Ratings
  - Linear System Theory And Design 4th Edition and Bestseller Lists
5. Accessing Linear System Theory And Design 4th Edition Free and Paid eBooks
  - Linear System Theory And Design 4th Edition Public Domain eBooks
  - Linear System Theory And Design 4th Edition eBook Subscription Services
  - Linear System Theory And Design 4th Edition Budget-Friendly Options
6. Navigating Linear System Theory And Design 4th Edition eBook Formats

- ePub, PDF, MOBI, and More
  - Linear System Theory And Design 4th Edition Compatibility with Devices
  - Linear System Theory And Design 4th Edition Enhanced eBook Features
7. Enhancing Your Reading Experience
    - Adjustable Fonts and Text Sizes of Linear System Theory And Design 4th Edition
    - Highlighting and Note-Taking Linear System Theory And Design 4th Edition
    - Interactive Elements Linear System Theory And Design 4th Edition
  8. Staying Engaged with Linear System Theory And Design 4th Edition
    - Joining Online Reading Communities
    - Participating in Virtual Book Clubs
    - Following Authors and Publishers Linear System Theory And Design 4th Edition
  9. Balancing eBooks and Physical Books Linear System Theory And Design 4th Edition
    - Benefits of a Digital Library
    - Creating a Diverse Reading Collection Linear System Theory And Design 4th Edition
  10. Overcoming Reading Challenges
    - Dealing with Digital Eye Strain
    - Minimizing Distractions
    - Managing Screen Time
  11. Cultivating a Reading Routine Linear System Theory And Design 4th Edition
    - Setting Reading Goals Linear System Theory And Design 4th Edition
    - Carving Out Dedicated Reading Time
  12. Sourcing Reliable Information of Linear System Theory And Design 4th Edition
    - Fact-Checking eBook Content of Linear System Theory And Design 4th Edition
    - Distinguishing Credible Sources
  13. Promoting Lifelong Learning
    - Utilizing eBooks for Skill Development
    - Exploring Educational eBooks
  14. Embracing eBook Trends
    - Integration of Multimedia Elements
    - Interactive and Gamified eBooks

## **Linear System Theory And Design 4th Edition Introduction**

In today's digital age, the availability of Linear System Theory And Design 4th Edition books and manuals for download has revolutionized the way we access information. Gone are the days of physically flipping through pages and carrying heavy textbooks or manuals. With just a few clicks, we can now access a wealth of knowledge from the comfort of our own homes or on the go. This article will explore the advantages of Linear System Theory And Design 4th Edition books and manuals for download, along with some popular platforms that offer these resources. One of the significant advantages of Linear System Theory And Design 4th Edition books and manuals for download is the cost-saving aspect. Traditional books and manuals can be costly, especially if you need to purchase several of them for educational or professional purposes. By accessing Linear System Theory And Design 4th Edition versions, you eliminate the need to spend money on physical copies. This not only saves you money but also reduces the environmental impact associated with book production and transportation.

Furthermore, Linear System Theory And Design 4th Edition books and manuals for download are incredibly convenient. With just a computer or smartphone and an internet connection, you can access a vast library of resources on any subject imaginable. Whether you're a student looking for textbooks, a professional seeking industry-specific manuals, or someone interested in self-improvement, these digital resources provide an efficient and accessible means of acquiring knowledge. Moreover, PDF books and manuals offer a range of benefits compared to other digital formats. PDF files are designed to retain their formatting regardless of the device used to open them. This ensures that the content appears exactly as intended by the author, with no loss of formatting or missing graphics. Additionally, PDF files can be easily annotated, bookmarked, and searched for specific terms, making them highly practical for studying or referencing. When it comes to accessing Linear System Theory And Design 4th Edition books and manuals, several platforms offer an extensive collection of resources. One such platform is Project Gutenberg, a nonprofit organization that provides over 60,000 free eBooks. These books are primarily in the public domain, meaning they can be freely distributed and downloaded. Project Gutenberg offers a wide range of classic literature, making it an excellent resource for literature enthusiasts. Another popular platform for Linear System Theory And Design 4th Edition books and manuals is Open Library. Open Library is an initiative of the Internet Archive, a non-profit organization dedicated to digitizing cultural artifacts and making them accessible to the public. Open Library hosts millions of books, including both public domain works and contemporary titles. It also allows users to borrow digital copies of certain books for a limited period, similar to a library lending system. Additionally, many universities and educational institutions have their own digital libraries that provide free access to PDF books and manuals. These libraries often offer academic texts, research papers, and technical manuals, making them invaluable resources for students and researchers. Some notable examples include MIT OpenCourseWare, which offers free access to course materials from the Massachusetts Institute of Technology, and the Digital Public Library of America, which provides a vast collection of digitized

books and historical documents. In conclusion, Linear System Theory And Design 4th Edition books and manuals for download have transformed the way we access information. They provide a cost-effective and convenient means of acquiring knowledge, offering the ability to access a vast library of resources at our fingertips. With platforms like Project Gutenberg, Open Library, and various digital libraries offered by educational institutions, we have access to an ever-expanding collection of books and manuals. Whether for educational, professional, or personal purposes, these digital resources serve as valuable tools for continuous learning and self-improvement. So why not take advantage of the vast world of Linear System Theory And Design 4th Edition books and manuals for download and embark on your journey of knowledge?

### FAQs About Linear System Theory And Design 4th Edition Books

**What is a Linear System Theory And Design 4th Edition PDF?** A PDF (Portable Document Format) is a file format developed by Adobe that preserves the layout and formatting of a document, regardless of the software, hardware, or operating system used to view or print it. **How do I create a Linear System Theory And Design 4th Edition PDF?** There are several ways to create a PDF: Use software like Adobe Acrobat, Microsoft Word, or Google Docs, which often have built-in PDF creation tools. Print to PDF: Many applications and operating systems have a "Print to PDF" option that allows you to save a document as a PDF file instead of printing it on paper. Online converters: There are various online tools that can convert different file types to PDF. **How do I edit a Linear System Theory And Design 4th Edition PDF?** Editing a PDF can be done with software like Adobe Acrobat, which allows direct editing of text, images, and other elements within the PDF. Some free tools, like PDFescape or Smallpdf, also offer basic editing capabilities. **How do I convert a Linear System Theory And Design 4th Edition PDF to another file format?** There are multiple ways to convert a PDF to another format: Use online converters like Smallpdf, Zamzar, or Adobe Acrobats export feature to convert PDFs to formats like Word, Excel, JPEG, etc. Software like Adobe Acrobat, Microsoft Word, or other PDF editors may have options to export or save PDFs in different formats. **How do I password-protect a Linear System Theory And Design 4th Edition PDF?** Most PDF editing software allows you to add password protection. In Adobe Acrobat, for instance, you can go to "File" -> "Properties" -> "Security" to set a password to restrict access or editing capabilities. Are there any free alternatives to Adobe Acrobat for working with PDFs? Yes, there are many free alternatives for working with PDFs, such as: LibreOffice: Offers PDF editing features. PDFsam: Allows splitting, merging, and editing PDFs. Foxit Reader: Provides basic PDF viewing and editing capabilities. How do I compress a PDF file? You can use online tools like Smallpdf, ILovePDF, or desktop software like Adobe Acrobat to compress PDF files without significant quality loss. Compression reduces the file size, making it easier to share and download. Can I fill out forms in a PDF file? Yes, most PDF viewers/editors like Adobe Acrobat, Preview (on Mac), or

various online tools allow you to fill out forms in PDF files by selecting text fields and entering information. Are there any restrictions when working with PDFs? Some PDFs might have restrictions set by their creator, such as password protection, editing restrictions, or print restrictions. Breaking these restrictions might require specific software or tools, which may or may not be legal depending on the circumstances and local laws.

**Find Linear System Theory And Design 4th Edition :**

**mcgraw hill companies guided activities answers**

[mazda 2015 cx 5 specifications](#)

*marzano research school leadership that works from*

[mathematics for economics and business pdf for download 7th edition](#)

[mathematical analysis and numerical methods for science and technology volume 2 functional and variational methods](#)

**manuale fotografia astronomica**

*mastering science workbook 3a answer download*

[mazda 323f 1999 owners manual](#)

[math talk a way to build student s engagement](#)

*maximum ride saving the world and other extreme sports*

**mazda protege repair manual en espanol**

matriculation mathematics semester 1 notes

[mathematical methods for physics and engineering solution manual pdf](#)

[mechanical engineering rs kurmi](#)

*marrakesh lonely planet*

**Linear System Theory And Design 4th Edition :**

Zyxel PK5001Z modem user guide Learn all about the Zyxel PK5001Z modem. Follow our guide to using the Zyxel PK5001Z, including setup options, compatibility details, firmware and more. PK5000Z Modem User Guide Learn about using your PK5000Z modem/router, including features and specs, popular modem settings, and troubleshooting. You can also watch a video about ... Setup instructions for PK5001Z modem router Aug 21, 2021 — I would like to download a PDF copy of the installation/setup instructions for a ZyXel K5001Z Modem Router. Is there a document out there ... Zyxel PK5001Z Product Manual - DSL Modem Manuals Factory resetting your modem is a quick but important troubleshooting tool that you can use

to help resolve most common networking problems. PK5001Z Users Manual (802.11n Wireless ADSL2+ 4-port ... View the Users Manual for the ZyXEL Communications model PK5001Z 802.11n Wireless ADSL2+ 4-port Gateway I88PK5001Z. View the PDF file for free. How do I configure a CenturyLink ZyXEL PK5001Z modem ... Select the Daktronics Router if listed or manually enter the WAN IP address assigned to it. Click Apply. Ensure that the modem is physically connected to the ... Download Manuals for the ZyXEL PK5001Z Advertisements User Manuals for the ZyXEL PK5001Z Download manuals for the DSL Modem for CenturyLink Phone Line and Internet Service ; Playback Rate ; Chapters. Configuring Actiontec M1000, C1000, and W1000, ZyXel ... Oct 13, 2021 — For Actiontec and ZyXel routers and most CenturyLink router/modems, there are two places for DNS settings. 1. Access the router's browser-based ... CenturyLink DSL Modem 2017 ZyXEL PK5001Z WiFi Modem design, the PK5001Z CenturyLink DSL modem supports WPA2/WPA/WEP and features a hardware WPS button allowing customers to enjoy easy setup using a simple button. Everything About the ZyXEL PK5001Z Router Sep 23, 2022 — Below is a list of guides that we have for the ZyXEL PK5001Z router. ZyXEL PK5001Z CenturyLink Guides. ZyXEL PK5001Z CenturyLink - Reset the ... Wiring diagram for alarm and remote start - Drive Accord May 4, 2020 — ITEM, WIRE COLOR, POLARITY, WIRE LOCATION. REMOTE START, SECURITY, KEYLESS ENTRY, ACCESSORIES. 12 Volts, white, +, front of fuse box, ... 1998 Honda Accord Alarm, Remote Start, Keyless Entry Wiring 1998 Honda Accord alarm, remote start, and keyless entry wire colors, functions, and locations. 2000 Honda Accord Alarm, Remote Start, Keyless Entry Wiring 2000 Honda Accord alarm, remote start, and keyless entry wire colors, functions, and locations. 92 Accord EX security system wiring diagram needed ASAP Jan 22, 2014 — Honda Accord (1990 - 2002) - 92 Accord EX security system wiring diagram needed ASAP - I have searched for two days. Honda Accord Car Alarm Wiring Information Commando Car Alarms offers free wiring diagrams for your Honda Accord. Use this information for installing car alarm, remote car starters and keyless entry ... Honda Accord Alarm Wiring Chart | PDF Honda Accord Alarm Wiring Chart - Free download as Text File (.txt), PDF File (.pdf) or read online for free. Guide to install an aftermarket alarm in a ... 1997 Honda Accord Exi - Keyless Entry System Dec 18, 2012 — of the Accord wiring diagram. Please help me. A lot of thanks! Subscribe. Related Topics. Need instructions - keyless entry remote programming. 1999 Honda Accord Wiring Diagrams | PDF - Scribd 1999 Honda Accord EX 1999 System Wiring Diagrams Honda - Accord. Fig. 61: Power Door Lock Circuit, LX W/O Keyless Entry. Friday, December 08, 2017 9:01:31 PM ... Need help with wiring diagram... - K20a.org Feb 12, 2010 — Hi guys, I have a 2004 Honda Accord Euro R and I was hoping that one of you alarm gurus could help me. I got most of the alarm installed (a ... Comprehensive Medical Terminology, 4th ed. Sep 7, 2015 — ... Comprehensive Medical Terminology, 4th ed. - NelsonBrain PDF for free ... You can publish your book online for free in a few minutes! Create ... Comprehensive Medical Terminology [[4th (fourth) ... Comprehensive Medical Terminology [[4th (fourth) Edition]] [Betty Davis Jones] on Amazon.com. \*FREE\* shipping on qualifying offers. Comprehensive Medical ... Comprehensive Medical Terminology - NGL School Catalog This comprehensive

book is organized by body system and specialty areas of ... 4th Edition | Previous Editions: 2008, 2003, 1999. ©2011, Published. \$90.75. Comprehensive Medical Terminology (New ... Book details ; ISBN-10. 1435439872 ; ISBN-13. 978-1435439870 ; Edition. 4th ; Publisher. Cengage Learning ; Publication date. June 24, 2010. Comprehensive Medical Terminology, Third Edition Page 1. Page 2. COMPREHENSIVE. Medical. Terminology. Third Edition. Betty Davis ... free StudyWAREtm CD-ROM is packaged with the book. The software is designed to. Comprehensive Medical Terminology 4th Edition, Jones Textbook solutions for Comprehensive Medical Terminology 4th Edition Jones and others in this series. View step-by-step homework solutions for your homework ... Medical Terminology for Interpreters (4th ed.): A Handbook This book is a must-have if you are new to this profession or looking for an invaluable resource to further your education as a practicing medical interpreter. Medical Terminology Complete! Medical Terminology Complete!, 4th edition. Published by Pearson (September 18, 2020) © 2019. Bruce Wingerd. Best Value. eTextbook. /mo. Print. \$111.99. MyLab. Medical Terminology in a Flash: A Multiple Learning Styles ... Medical Terminology in a Flash: A Multiple Learning Styles Approach. 4th Edition ... book version of the text offer multiple paths to learning success. This ... An Illustrated Guide to Veterinary Medical Terminology, 4th ... This user-friendly textbook delivers a unique pedagogical presentation that makes it a comprehensive learning resource. Focusing on how medical terms are formed ...