

# Fuzzy Stochastic Differential Equations Driven by a Fuzzy Brownian Motion

Kumwimba S. Didier<sup>1</sup>, Walo O. Rebecca<sup>2</sup>, Mabela M. Rostin<sup>2</sup>, Badibi O. Christopher<sup>1</sup>,  
Kankolongo K. Patient<sup>1</sup>, Marcel Remon<sup>3</sup>

<sup>1</sup>Département de Mathématiques et Informatique, Faculté des Sciences, Université de Lubumbashi, Lubumbashi, République Démocratique du Congo

<sup>2</sup>Département de Mathématiques, Informatique et Statistiques, Faculté des Sciences et Technologies, Université de Kinshasa, Kinshasa, République Démocratique du Congo

<sup>3</sup>Département de Mathématiques, Faculté des Sciences, Université de Namur, Namur, Belgique

Email: didierkumwimba@gmail.com

**How to cite this paper:** Didier, K.S., Rebecca, W.O., Rostin, M.M., Christopher, B.O., Patient, K.K. and Remon, M. (2022) Fuzzy Stochastic Differential Equations Driven by a Fuzzy Brownian Motion, *Journal of Applied Mathematics and Physics*, 10, 641-655. <https://doi.org/10.4236/jamp.2022.103046>

Received: January 8, 2022

Accepted: March 5, 2022

Published: March 8, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0). <http://creativecommons.org/licenses/by/4.0/>



Open Access

---

## Abstract

In our previous work, we study fuzzy Itô integrals driven by a fuzzy Brownian motion. In this article, we continue this study. The purpose of this paper is to study the weak uniqueness of fuzzy stochastic differential equations taking into account fuzzy Brownian motion. For instance, we construct the fuzzy stochastic differential equation driven by a fuzzy Brownian motion. To define and prove our results, we use the fuzzification, the alpha cut method and the Hausdorff distance between two fuzzy quantities. Some results are to our credit in this article like the instance, we construct the fuzzy stochastic differential equation driven by fuzzy Brownian motion. Furthermore, we develop fuzzy Itô calculus driven by a fuzzy Brownian motion. Our result complement existing ones in that the fuzzy version of Brownian motion is taken into account.

## Keywords

Adapted Fuzzy Stochastic Process, Fuzzy Itô Process, Fuzzy Itô Formula, Hukuhara Generalized Derivative

---

## 1. Introduction

In our previous research, we have dealt with Fuzzy Itô Integral Driven by a Fuzzy Brownian Motion and in the present work, we develop Fuzzy stochastic differential equations driven by a fuzzy Brownian motion [1].

Historically, the earliest approach for deterministic fuzzy differential equations

# Stochastic Fuzzy Differential Equations With An Application

**ML Morrison**



## **Stochastic Fuzzy Differential Equations With An Application:**

Recognizing the exaggeration ways to acquire this ebook **Stochastic Fuzzy Differential Equations With An Application** is additionally useful. You have remained in right site to start getting this info. acquire the Stochastic Fuzzy Differential Equations With An Application associate that we allow here and check out the link.

You could buy guide Stochastic Fuzzy Differential Equations With An Application or get it as soon as feasible. You could speedily download this Stochastic Fuzzy Differential Equations With An Application after getting deal. So, taking into consideration you require the books swiftly, you can straight get it. Its suitably entirely easy and fittingly fats, isnt it? You have to favor to in this declare

<https://db1.greenfirefarms.com/data/detail/index.jsp/Beginner%20Friendly%20Ai%20Writing%20Assistant%20For%20Small%20Business%20For%20Beginners%206437.pdf>

## **Table of Contents Stochastic Fuzzy Differential Equations With An Application**

1. Understanding the eBook Stochastic Fuzzy Differential Equations With An Application
  - The Rise of Digital Reading Stochastic Fuzzy Differential Equations With An Application
  - Advantages of eBooks Over Traditional Books
2. Identifying Stochastic Fuzzy Differential Equations With An Application
  - 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 Stochastic Fuzzy Differential Equations With An Application
  - User-Friendly Interface
4. Exploring eBook Recommendations from Stochastic Fuzzy Differential Equations With An Application
  - Personalized Recommendations
  - Stochastic Fuzzy Differential Equations With An Application User Reviews and Ratings

- Stochastic Fuzzy Differential Equations With An Application and Bestseller Lists
- 5. Accessing Stochastic Fuzzy Differential Equations With An Application Free and Paid eBooks
  - Stochastic Fuzzy Differential Equations With An Application Public Domain eBooks
  - Stochastic Fuzzy Differential Equations With An Application eBook Subscription Services
  - Stochastic Fuzzy Differential Equations With An Application Budget-Friendly Options
- 6. Navigating Stochastic Fuzzy Differential Equations With An Application eBook Formats
  - ePub, PDF, MOBI, and More
  - Stochastic Fuzzy Differential Equations With An Application Compatibility with Devices
  - Stochastic Fuzzy Differential Equations With An Application Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Stochastic Fuzzy Differential Equations With An Application
  - Highlighting and Note-Taking Stochastic Fuzzy Differential Equations With An Application
  - Interactive Elements Stochastic Fuzzy Differential Equations With An Application
- 8. Staying Engaged with Stochastic Fuzzy Differential Equations With An Application
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Stochastic Fuzzy Differential Equations With An Application
- 9. Balancing eBooks and Physical Books Stochastic Fuzzy Differential Equations With An Application
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Stochastic Fuzzy Differential Equations With An Application
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Stochastic Fuzzy Differential Equations With An Application
  - Setting Reading Goals Stochastic Fuzzy Differential Equations With An Application
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Stochastic Fuzzy Differential Equations With An Application
  - Fact-Checking eBook Content of Stochastic Fuzzy Differential Equations With An Application
  - 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

### **Stochastic Fuzzy Differential Equations With An Application Introduction**

In the digital age, access to information has become easier than ever before. The ability to download Stochastic Fuzzy Differential Equations With An Application has revolutionized the way we consume written content. Whether you are a student looking for course material, an avid reader searching for your next favorite book, or a professional seeking research papers, the option to download Stochastic Fuzzy Differential Equations With An Application has opened up a world of possibilities. Downloading Stochastic Fuzzy Differential Equations With An Application provides numerous advantages over physical copies of books and documents. Firstly, it is incredibly convenient. Gone are the days of carrying around heavy textbooks or bulky folders filled with papers. With the click of a button, you can gain immediate access to valuable resources on any device. This convenience allows for efficient studying, researching, and reading on the go. Moreover, the cost-effective nature of downloading Stochastic Fuzzy Differential Equations With An Application has democratized knowledge. Traditional books and academic journals can be expensive, making it difficult for individuals with limited financial resources to access information. By offering free PDF downloads, publishers and authors are enabling a wider audience to benefit from their work. This inclusivity promotes equal opportunities for learning and personal growth. There are numerous websites and platforms where individuals can download Stochastic Fuzzy Differential Equations With An Application. These websites range from academic databases offering research papers and journals to online libraries with an expansive collection of books from various genres. Many authors and publishers also upload their work to specific websites, granting readers access to their content without any charge. These platforms not only provide access to existing literature but also serve as an excellent platform for undiscovered authors to share their work with the world. However, it is essential to be cautious while downloading Stochastic Fuzzy Differential Equations With An Application. Some websites may offer pirated or illegally obtained copies of copyrighted material. Engaging in such activities not only violates copyright laws but also undermines the efforts of authors, publishers, and researchers. To ensure ethical downloading, it is advisable to utilize reputable websites that prioritize the legal distribution of content. When downloading Stochastic Fuzzy Differential Equations With An Application, users should also consider the potential security risks associated with online platforms. Malicious actors may

exploit vulnerabilities in unprotected websites to distribute malware or steal personal information. To protect themselves, individuals should ensure their devices have reliable antivirus software installed and validate the legitimacy of the websites they are downloading from. In conclusion, the ability to download Stochastic Fuzzy Differential Equations With An Application has transformed the way we access information. With the convenience, cost-effectiveness, and accessibility it offers, free PDF downloads have become a popular choice for students, researchers, and book lovers worldwide. However, it is crucial to engage in ethical downloading practices and prioritize personal security when utilizing online platforms. By doing so, individuals can make the most of the vast array of free PDF resources available and embark on a journey of continuous learning and intellectual growth.

### FAQs About Stochastic Fuzzy Differential Equations With An Application Books

1. Where can I buy Stochastic Fuzzy Differential Equations With An Application books? Bookstores: Physical bookstores like Barnes & Noble, Waterstones, and independent local stores. Online Retailers: Amazon, Book Depository, and various online bookstores offer a wide range of books in physical and digital formats.
2. What are the different book formats available? Hardcover: Sturdy and durable, usually more expensive. Paperback: Cheaper, lighter, and more portable than hardcovers. E-books: Digital books available for e-readers like Kindle or software like Apple Books, Kindle, and Google Play Books.
3. How do I choose a Stochastic Fuzzy Differential Equations With An Application book to read? Genres: Consider the genre you enjoy (fiction, non-fiction, mystery, sci-fi, etc.). Recommendations: Ask friends, join book clubs, or explore online reviews and recommendations. Author: If you like a particular author, you might enjoy more of their work.
4. How do I take care of Stochastic Fuzzy Differential Equations With An Application books? Storage: Keep them away from direct sunlight and in a dry environment. Handling: Avoid folding pages, use bookmarks, and handle them with clean hands. Cleaning: Gently dust the covers and pages occasionally.
5. Can I borrow books without buying them? Public Libraries: Local libraries offer a wide range of books for borrowing. Book Swaps: Community book exchanges or online platforms where people exchange books.
6. How can I track my reading progress or manage my book collection? Book Tracking Apps: Goodreads, LibraryThing, and Book Catalogue are popular apps for tracking your reading progress and managing book collections. Spreadsheets: You can create your own spreadsheet to track books read, ratings, and other details.
7. What are Stochastic Fuzzy Differential Equations With An Application audiobooks, and where can I find them?

- Audiobooks: Audio recordings of books, perfect for listening while commuting or multitasking. Platforms: Audible, LibriVox, and Google Play Books offer a wide selection of audiobooks.
8. How do I support authors or the book industry? Buy Books: Purchase books from authors or independent bookstores. Reviews: Leave reviews on platforms like Goodreads or Amazon. Promotion: Share your favorite books on social media or recommend them to friends.
  9. Are there book clubs or reading communities I can join? Local Clubs: Check for local book clubs in libraries or community centers. Online Communities: Platforms like Goodreads have virtual book clubs and discussion groups.
  10. Can I read Stochastic Fuzzy Differential Equations With An Application books for free? Public Domain Books: Many classic books are available for free as they're in the public domain. Free E-books: Some websites offer free e-books legally, like Project Gutenberg or Open Library.

### **Find Stochastic Fuzzy Differential Equations With An Application :**

[beginner friendly ai writing assistant for small business for beginners 6437](#)

[how to start ai image generator full tutorial 6198](#)

[best way to us national parks full tutorial for beginners 6074](#)

[trending ai image generator for students for beginners 6479](#)

**expert anti inflammatory diet step plan for creators 7203**

[beginner friendly pilates for beginners for moms for creators 6183](#)

**top ai image generator online for experts 6182**

[how to use sleep hygiene tips tips 7634](#)

[ultimate credit score improvement step plan for creators 7757](#)

[what is anti inflammatory diet for beginners 7372](#)

**how to content marketing strategy guide for creators 6782**

[affordable content marketing strategy guide for beginners 6438](#)

[simple digital nomad visa for moms for creators 7030](#)

[advanced affiliate marketing for creators for creators 6610](#)

[ultimate matcha health benefits for creators for students 7381](#)

**Stochastic Fuzzy Differential Equations With An Application :**

vocational schools İstanbul - Dec 27 2021

colleges that change lives 40 schools that will - Jan 08 2023

web this new edition profiles 41 colleges all of which outdo the ivies and research universities in producing performers not only among a students but also among those who get bs

**colleges that change lives 40 schools that will change the** - May 12 2023

web jul 8 2021 a former new york times editor wrote a book listing 40 colleges that change lives here we explore these schools to help you decide if one is right for you

40 colleges that change lives puget sound is selected to join - Mar 30 2022

web 41 of high school students are recipients of academic scholarships 5 10 of students are dual citizens top 0 7 in nation transfer students accepted to high school this

**colleges that change lives 40 schools that will change the** - Sep 04 2022

web about colleges that change lives the groundbreaking guide to the 40 best colleges you ve never heard of colleges that will change your life choosing the right college

colleges that change lives wikipedia - Sep 16 2023

web colleges that change lives 40 schools that will change the way you

**top 10 most community college transfer friendly universities** - Oct 25 2021

secondary school profile 2021 2022 enka - Feb 26 2022

web oct 10 2020 the list of top 10 schools by us news and world report includes arizona state university with 5 388 transfer students university of central florida with 5 336

**colleges that change lives 40 schools that will change the** - Aug 03 2022

web aug 28 2012 college guide reviews schools that help students grow and succeed tacoma wash university of puget sound has been chosen as one of a select group

**what is your next school like enka k12 tr** - Nov 25 2021

**colleges that change lives 40 schools that will change the** - Nov 06 2022

web colleges that change lives 40 schools that will change the way you think about colleges pope loren free download borrow and streaming internet archive

**colleges that change lives should you attend one** - Feb 09 2023

web ix 340 p 20 cm offers profiles of forty one colleges that focus on individual needs and academic standards provides tips for choosing a school based on personality and

*colleges that change lives collegexpress* - Jun 13 2023

web the colleges that change lives scholarship was established in 2016 to honor the 20th anniversary of the publication of the first edition of loren pope s classic book and the

**colleges that change lives changing lives one** - Mar 10 2023

web colleges that change lives 40 schools that will change the way you think about colleges ebook written by loren pope read this book using google play books app

*colleges that change lives 40 schools that will change the way* - Oct 05 2022

web aug 28 2012 colleges that change lives 40 schools that will change the way you think about colleges by loren pope and hilary masell oswald aug 28 2012 4 3 out of

colleges that change lives 40 schools that will - Jul 14 2023

web jul 25 2006 this new edition profiles 41 colleges all of which outdo the ivies and research universities in producing performers not only among a students but also

**amazon com 40 colleges that change lives** - Jun 01 2022

web may 4 2018 scientific knowledge is creating new opportunities and solutions that can enrich our lives while at the same time fuelling disruptive waves of change in every

**colleges that change lives 40 schools that will change the way** - Jul 02 2022

web of high school students are recipients of academic scholarships 6 of high school students are recipients of elite athlete scholarships competing on turkish national teams

colleges that change lives 40 schools that will change the - Apr 11 2023

web colleges that change lives 40 schools that will change the way you think about colleges loren pope penguin 2006 education 382 pages prospective college

*colleges that change lives 40 schools that will* - Dec 07 2022

web colleges that change lives 40 schools that will change the way you think about colleges award outstanding books for the college bound and lifelong learners year

colleges that change lives penguin random house - Apr 30 2022

web farabi change program e learning moodle ist research campuses introduction movie bridge of the science from history to the future all rights belong to istanbul

[the future of education and skills oecd](#) - Jan 28 2022

[colleges that change lives 40 schools that will](#) - Aug 15 2023

web aug 28 2012 the groundbreaking guide to the 40 best colleges you ve never heard of colleges that will change your lifechoosing the right college has never been more

**nass the mutapa state 1417 words graduateway** - Aug 02 2022

web jan 24 2023 the following reasons can be used to account for the rise and expansion of the mutapa state scarcity of reasons such as salt pastures etc at great zimbabwe

**mutapa world history encyclopedia** - Apr 10 2023

web the kingdom of mutapa sometimes referred to as the mutapa empire mwenemutapa shona mwene we mutapa

portuguese monomotapa was an african kingdom in

[the origin and rise of the mutapa state updated 2023](#) - Sep 03 2022

web reason for the decline mutapa state downloaded from old vulkk com by guest colon neal encyclopedia of african colonial conflicts volume i and ii univ of california

*reason for the decline mutapa state copy uniport edu* - Dec 26 2021

web in this video manners msongelwa explains the internal factors which contributed towards the decline of the mtapa state

**the rise and fall of mutapa mutapa empire** - Oct 04 2022

web dec 6 2016 mudenge s i g 1988 38 states that it is possible that civil wars overpopulation around great zimbabwe famine plague decreasing gold production

[the origin rise and fall of the mutapa state african history](#) - Jan 07 2023

web mar 5 2023 this could have attracted foreign intervention hence facilitating its downfall there were civil wars among the mutapa people as a result of succession disputes for

*reason for the decline mutapa state download only* - Apr 29 2022

web jul 11 2023 considering some harmful virus inside their computer reason for the decline mutapa state is genial in our digital library an online permission to it is set as public

**the mtapa state decline internal factors youtube** - Oct 24 2021

[what led to the decline of the mutapa empire](#) - May 11 2023

web the mutapa empire declined due to civil wars that led to a weakened government the portuguese tried to invade the mutapa empire in 1590 during the see full answer below

[reasons for the fall of the mutapa state updated 2023](#) - Aug 14 2023

web jan 24 2023 the following reasons can be given to account for the fall of the mutapa state the succession to the throne by weak leaders such as the mukombwes and negomo succession disputes which often led to civil wars the vast size of the state made

**the decline of the mutapa state c 1623 c 1902** - Jul 13 2023

web the cultural political and military decline of the mutapa state had probably begun from the 1590 s exacerbated by increasingly frequent civil wars and the maravi invasions the

[the mutapa state decline external factors youtube](#) - Nov 05 2022

web jan 24 2023 most historians agree that the mutapa state was an off shoot of the great zimbabwe state the decline of great zimbabwe led to the rise of the mutapa state

[kingdom of mutapa wikipedia](#) - Mar 09 2023

web jan 29 2023 in what is today the nation of zimbabwe various subgroups of the bantu speaking shona established pre colonial african kingdoms or states including torwa

**what causes the decline of mutapa state heimduo** - Jun 12 2023

web aug 14 2020 the following reasons can be given to account for the fall of the mutapa state the vast size of the state made communication and control difficult persistent

[reason for the decline mutapa state htaccess guide](#) - Jan 27 2022

web apr 12 2023 reason for the decline mutapa state 2 7 downloaded from uniport edu ng on april 12 2023 by guest reform dynamics in southern africa have to be understood

[reasons for the rise of the mutapa state updated 2023](#) - May 31 2022

web reason for the decline mutapa state right here we have countless books reason for the decline mutapa state and collections to check out we additionally have the funds

**reason for the decline mutapa state pdf uniport edu** - Nov 24 2021

web as this reason for the decline mutapa state it ends going on creature one of the favored books reason for the decline mutapa state collections that we have this is

**reason for the decline mutapa state copy old vulkk** - Jul 01 2022

web 2 reason for the decline mutapa state 2021 03 21 reason for the decline mutapa state downloaded from ol wise edu jo by guest woodard jose the zimbabwe

**reason for the decline mutapa state kevin shillington book** - Mar 29 2022

web mar 20 2023 all we present reason for the decline mutapa state and numerous book collections from fictions to

scientific research in any way along with them is this reason

**the downfall of the mutapa state the sunday news** - Dec 06 2022

web mar 16 2018 in this video manners msongelwa explains the external factors which contributed towards the decline of the mtapa state

*mutapa empire history decline what was the kingdom of* - Feb 08 2023

web factors that led to the rise of mutapa state mutapa state rose due to a number is factors 1 shortage of resources such as gold salt at great zimbabwe led to the

**reason for the decline mutapa state uniport edu** - Feb 25 2022

web may 1 2023 getting the books reason for the decline mutapa state now is not type of challenging means you could not abandoned going in imitation of book stock or library

**reason for the decline mutapa state pqr uiaf gov co** - Sep 22 2021

engineering economics and finance chapter6 solving exercise - Feb 13 2023

web engineering economics and finance chapter6 solving exercise this free download pdf as one of the predominant working sellers here will totally be joined

**engineering economics and finance chapter6 solving exercise** - Jul 06 2022

web thetech insider com

*engineering economics and finance chapter6 solving exercise* - Oct 29 2021

**engineering economics and finance chapter6 solving exercise** - Sep 08 2022

web the publication engineering economics and finance chapter6 solving exercise that you are looking for it will very squander the time however below bearing in mind you

**engineering economics and finance chapter6 solving exercise** - Dec 31 2021

web engineering economics and finance chapter6 solving exercise is available in our book collection an online access to it is set as public so you can get it instantly our

engineering economics and finance chapter6 solving exercise - Nov 29 2021

*engineering economy 6th edition textbook solutions* - May 16 2023

web engineering economics and finance chapter6 solving exercise computational intelligence in economics and finance nov 24 2020 readers will find in this highly

**engineering economics and finance chapter6 solving exercise** - Mar 02 2022

web may 8 2023 engineering economics and finance chapter6 solving exercise as one of the most enthusiastic sellers here will totally be in the middle of the best options to

engineering economics and finance chapter6 solving exercise - Feb 01 2022

web apr 12 2023 engineering economics and finance chapter6 solving exercise 2 16 downloaded from uniport edu ng on april 12 2023 by guest but also to address key

**engineering economics and finance chapter6 solving exercise** - Dec 11 2022

web engineering economics and finance chapter6 solving exercise 1 engineering economics and finance chapter6 solving exercise as recognized adventure as

*engineering economics and finance chapter6 solving exercise* - Nov 10 2022

web engineering economics and finance chapter6 solving exercise engineering economics and finance chapter6 engineering economics chapter6a pdf

*engineering economics and finance chapter6 solving exercise* - Jan 12 2023

web engineering economics and finance chapter6 solving exercise economic decision making and risk analysis risk analysis in engineering and economics second

engineering economics and finance chapter6 solving exercise - Jul 18 2023

web feb 27 2023 merely said the engineering economics and finance chapter6 solving exercise is universally compatible with any devices to read financial engineering with

**ebook engineering economics and finance chapter6 solving** - Mar 14 2023

web engineering economics and finance uts handbooklearn finance chapter 6 interest rates with free interactive flashcards choose from 500 different sets of finance

**engineering economics and finance chapter6 solving exercise** - Apr 03 2022

web mar 22 2023 engineering economics and finance chapter6 solving exercise 1 13 downloaded from uniport edu ng on march 22 2023 by guest engineering economics

*engineering economics solved exam problems ch1 ch4* - Jun 17 2023

web feb 19 2020 engineering economics solved exam problems ch1 ch4 feb 19 2020 0 likes 14 929 views download now download to read offline engineering

engineering economics and finance chapter6 solving exercise - Jun 05 2022

web finance chapter6 solving exercise belong to that we give here and check out the link you could purchase lead engineering economics and finance chapter6 solving

engineering economics and finance chapter6 solving exercise - Oct 09 2022

web engineering economics and finance chapter6 solving exercise 1 engineering economics and finance chapter6 solving exercise analysis and valuation risk

**engineering economics and finance chapter6 solving exercise** - Sep 20 2023

web intelligence in economics and finance apr 24 2021 readers will find in this highly relevant and groundbreaking book research ranging from applications in financial

**engineering economics and finance chapter6 solving exercise** - Aug 19 2023

web apr 1 2023 engineering economics and finance chapter6 solving exercise is available in our digital library an online access to it is set as public so you can download it

**engineering economics financial decision making for** - Apr 15 2023

web engineering economics and finance chapter6 solving exercise 1 engineering economics and finance chapter6 solving exercise business economics and

*engineering economics and finance chapter6 solving exercise* - Aug 07 2022

web engineering economics and finance chapter6 solving exercise 1 engineering economics and finance chapter6 solving exercise engineering economics

**thetech insider com** - May 04 2022

web mar 16 2023 engineering economics and finance chapter6 solving exercise after getting deal so taking into consideration you require the book swiftly you can straight