



# The Manga Guide to Linear Algebra

*Shin Takahashi , Iroha Inoue , Trend-Pro Co. Ltd.*

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Reiji wants two things in life: a black belt in karate and Misa, the girl of his dreams. Luckily, Misa's big brother is the captain of the university karate club and is ready to strike a deal: Reiji can join the club if he tutors Misa in linear algebra.

Follow along in *The Manga Guide to Linear Algebra* as Reiji takes Misa from the absolute basics of this tricky subject through mind-bending operations like performing linear transformations, calculating determinants, and finding eigenvectors and eigenvalues. With memorable examples like miniature golf games and karate tournaments, Reiji transforms abstract concepts into something concrete, understandable, and even fun.

As you follow Misa through her linear algebra crash course, you'll learn about:

Basic vector and matrix operations such as addition, subtraction, and multiplication

Linear dependence, independence, and bases

Using Gaussian elimination to calculate inverse matrices

Subspaces, dimension, and linear span

Practical applications of linear algebra in fields like computer graphics, cryptography, and engineering

But Misa's brother may get more than he bargained for as sparks start to fly between student and tutor. Will Reiji end up with the girl—or just a pummeling from her oversized brother? Real math, real romance, and real action come together like never before in *The Manga Guide to Linear Algebra*.

## The Manga Guide to Linear Algebra Details

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# From Reader Review The Manga Guide to Linear Algebra for online ebook

## Venkatesh-Prasad says

An accessible introduction to basics of linear algebra provided you are comfortable with basic algebra and matrix. The number of examples and visual illustration is the biggest pluses of the book. At times, I wished the author would elaborate the statements, e.g., minimality of basis.

The "comic book" aspect did not make a huge difference for me; may be, it would for high schoolers or eager middle schoolers.

All said, it provides an easy and quick refresher on linear algebra. It would make a great gift for high schoolers or eager middle schoolers :)

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## Dnabre says

This is an entertaining run through of all of the main concepts of linear algebra. While it doesn't go through proofing any of the methods or properties, it gives you good intuition for them. The topics covered are on par or greater than an introductory college course in linear algebra.

The only fault I found is that it rushes through matrix multiplication. This is a pretty critical thing to master early, and if the reader isn't familiar with how to multiply matrices, it will make the rest of the book difficult.

I'd recommend this as a casual secondary book to students taking linear algebra who tend to have difficulty with formal mathematics or to someone that hasn't worked with linear algebra in a long time and needs to refresh their knowledge.

Note while the translation from the original Japanese is excellent some of the math terminology used varied from what I've used to from multiple books/courses/universities. This shouldn't be a major problem, the different terms aren't such that they might be confused, but students should make sure they know what terms match up to what in their coursework (it should not be difficult).

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## J. Nick Fisk says

Surprisingly a really good guide. I tend to only keep 1 reference per subject and this is it for Linear algebra. Won't replace a class or anything, but enough to piece together the subject when you need it.

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## Alex says

Probably more like 3.5 stars, but rounding up because I can see what the creators were going for and I think

it's a laudable idea. Trying to present complex topics in the context of a story is a good idea, but the two were less interwoven here and more just interleaved. I also think that the difficulty of this kind of material when approached without an instructor can quickly become a step function, and human explanation can be required to bridge some of the gaps as you move through the topics. I still learned a few things, but this book is probably more useful for someone concurrently taking an actual course in some of the same material.

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## Craig says

The preface of this book states that it is "meant as a complement to other, more comprehensive literature, not as a substitute." It would of course be wise of me to agree with this statement, but I'm tempted not to. I have my reasons.

I took Linear Algebra in college as part of my Computer Science curriculum. Having persisted through three semesters of Calculus by will power alone, and having heard horror stories about Linear Algebra, I duly invested the effort required to get a decent grade. With that hurdle behind me, thus completing my mathematics requirements, I focused the rest of my college thoughts exclusively on computers until the last residual matrix reduced to null in the outer reaches of my mind space. I was free!

But then the unexpected happened. Years later, firmly settled into my minimal-math computing career, an intermittent musing continued to flounder about in the back of my brain. "What is Linear Algebra? Why don't I feel like I learned anything?" I eventually realized that my course's extraordinary emphasis on crunching numbers, solving simplistic problems, and working out proofs had left a giant void in my conceptual understanding of the topic. If somebody had asked me at that time what Linear Algebra is and what it's good for, my response would have been a face slowly contorting into frustration.

When I stumbled upon The Manga Guide to Linear Algebra, I just knew I had to read it. In addition to the unabated glee that came from broadcasting such a ridiculous selection to my Goodreads comrades, I thought, "Maybe these Japanese cartoons can teach me what the university failed to?" If I learned a little bit about martial arts and love in the process, so be it.

This book exceeded my expectations. It's absurd and unassuming, and these two things combine to make it impossible to put down. I was knee deep in matrices before the "What the heck am I reading?" factor wore off. And to my delight, I found myself understanding matrix and vector algebra in a more intuitive way thanks to the book's highly visual presentation of darn near everything.

It's this latter point that makes the book so effective. It's a comic book about math. There are no rules. Whatever is proper in a math textbook - whether it's visual consistency, formal language, or being rigidly organized, compartmentalized, and sterilized - this is of no concern to Misa as she works around Reiji's karate schedule to tutor him on eigenvectors. There's no pressure for it to conform to comic book conventions, either. Every chapter concludes with several pages of math, sans the comic flair.

While this is not a substitute to "comprehensive literature," it may in fact be good enough to get the job done. The proof is in the purin. I've recently ventured into the 3D video game programming landscape, and I'm using vector and matrix math concepts to solve some fairly sophisticated problems of my own creation, a feat that would have been virtually impossible without the intuitive understanding I gleaned from this book.

So what is this book, then? To my mind, it's simply the most effective way to convey the conceptual

framework of Linear Algebra. It's not a textbook. There are no homework problems. But, then again, cranking through problems with a pencil and paper won't necessarily get you any closer to understanding what it's all about. Besides, can't computers do that?

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### **Wattanit Hotrakool says**

Interesting delivery of a serious topic. The maths details are surprisingly deep — more of a university-level rather than a high-school level.

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### **Dorum says**

The concepts are explained in a relatively simple manner, most of them at least but:

- 1) The background story sucks. It is bland and has nothing to do with linear algebra.
- 2) The explanations are no different from any decent manual of basic linear algebra.
- 3) The authors takes what I would call a "cop-out". Whenever some more difficult concepts have to be explained, he skips the manga and simply makes long pages of text.

This three points really ruined it for me. I think Linear Algebra Done Right is a much better introduction to the subject.

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### **Yami says**

I'm giving this 4 stars as reading it was as much entertaining as it was useful. I needed a quick review on the basics of Algebra and this sure did the trick. These manga guides are delightful to read; they have a guide to statistics and data basis which are, I'm sure, as interesting to have.

The manga guide to Linear Algebra contains an overview of the fundamentals concerning set and number theory, functions, permutations and combinations. Then, of course, there is an introduction to matrices and vectors as well as various operations on these, linear transformations, and eigenvalues and eigenvectors.

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### **Martin says**

This book shows why karate and linear algebra could be important in your life.

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### **Chandra Prakash says**

This book is awesome, I really enjoyed reading this book. The way ideas are presented its quite good.

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## **Johan says**

I really enjoyed the databases and universe manga guides, but this one was a tough nut to crack. I studied linear algebra little over half a life ago, but most of it didn't ring a bell and I found it hard to understand what it was about. Weird. Will try another one.

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## **Senthil Kumaran says**

Manga Guide to Linear Algebra is a manga comic that teaches linear algebra concept. When I stumbled upon the terms Eigenvalues and Eigenvectors, I found those were greek to me, and I had no intuitive understanding of those terms. I decided to spend 4-hours to read about the basics of linear algebra from this book.

The book starts with the concept of sets, functions, and relations. Then introduces matrices, and then vectors. It gives a gentle introduction to various matrix operations. Gives visual clue on vector representations. Introduces the concept of linear dependence and linear independence in vectors.

Shows the examples of linear transformations which are practical applications of linear algebra and finally goes to introduce eigenvalues and eigenvectors. Finally, for Eigenvalues and Eigenvectors, these are the examples that are shown.

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## **Bruno Barcellos says**

Esperava mais. Pensei que fosse seguir o ritmo de ensino igual os livros da série Use a Cabeça. Esse livro só consegue "facilitar" o aprendizado das coisas mais simples do assunto. No geral, o estilo de transformar o estudo em uma história em Mangá, não acrescenta muita coisa, e vai ficando cada vez mais claro a medida que o assunto começa a ficar mais difícil.

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## **Timothy Deng says**

Charming plot, if a little obvious! Great explanation on the differences between bases and linear independence. One of the most valuable things I learned in here was finding the inverse of a matrix without using the terrible cofactor method they teach in school. The explanations on linear transformations and eigenvalues/eigenvectors helped me understand their meaning better conceptually, though I do wish there was more time spent on those two topics in particular.

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## **Christina says**

A great refresh of linear algebra as my career has taken a turn into data science and machine learning algorithms. It was also exciting to see my local library had this and several others in the series (some of which I also took home) as they are a fun way to interact with complex mathematical concepts!

