~~~Title.Subtitle~~~

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author note: Provide information about the author’s departmental affiliation, acknowledgments of assistance or financial support, and a mailing address for correspondence.

abstract: abstract

keywords:

reference:

# Abstract

# Introduction

The study of classical mechanics often begins with projectile motion. We model the object in motion as a particle with mass, position, velocity, and acceleration. Also, we start with one dimension, then build up to two and three dimensions. Tara Bhandari (2020) asked about calculating the displacement for constant acceleration objects.

# Kinematic Along a Line

Let’s begin with motion along the x-axis. Knight (Knight 2016) provides his expanded version of the suvat (Sparks 2018) equations.



| Variable | Description |
| --- | --- |
|  | The magnitude of the initial displacement |
|  | The magnitude of the final displacement |
|  | The magnitude of the initial velocity |
|  | The magnitude of the final velocity |
|  | The initial time |
|  | The final time |
|  | The difference between initial and final times, |
|  | The constant acceleration, |

Knight loves to use  where most folks just assume  and let .

The special case where the acceleration is zero greatly simplifies the set of equations.



The initial and final velocities are the same. The final displacement is a linear relation with the velocity and time. For example if



You can get the displacement along a line directly from the kinematic equations.



Now for a more complicated example

For a particle that starts at , with an initial velocity of , and a negative acceleration (deceleration) of . What is the displacement  as a function of time?



The plot of the displacement and velocity of a particle decelerating . At the particle is moving at  . We track its motion through . The velocity slows to nothing in 60 s.

# Kinematics in Two Dimensions

Displacement, velocity, and acceleration are all vector quantities, i.e., they have both magnitude and direction. Ling (2016) has a good discussion of vector and vector arithmetic.

In two dimensions, the vector definitions for displacement, , velocity, , and acceleration, , are:



Note: The acceleration is constant.

We call upon Doctor Pythagoras to give us their magnitude



And the direction of these vectors



Warning: Physicists and mathematicians use a different coordinate system for angles than do marine and aviation navigators. We use East at 0° with North at 90°. Navigators use North as 0° and East at 90°. The wind speed also is different. A northeast wind blows from the northeast to the southwest, not from the southwest to the northeast, i.e., we point our vectors in the direction the wind is blowing. Don’t screw up your FAA Private Pilot Exam by mixing them up.

We can apply our kinematic equations separately along each axis and combine the results at the end.

# Results

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# Discussion

Fusce placerat eros pharetra purus sollicitudin, non suscipit mi ornare. Integer maximus placerat tincidunt. Quisque neque ligula, pharetra et leo nec, consectetur commodo velit. In cursus neque ligula, fringilla mollis nunc feugiat ut. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Vivamus a elit neque. Quisque auctor ipsum mauris, eu finibus augue tincidunt at. Integer ac nunc a arcu cursus dapibus in feugiat sapien. Sed in auctor mi. In rhoncus risus in lorem ullamcorper pretium ut eu sapien.

# Conclusion

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# Acknowledgments

~~~Acknowledge contributions of colleagues in this section. Be sure to acknowledge financial support.~~~

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# References

Bhandari, Tara. 2020. “For a Motion on a Curved Path with Constant Acceleration (Magnitude of Displacement / Distance Covered) Is?” Question & Answer. *Quora* (blog). June 9, 2020. https://www.quora.com/For-a-motion-on-a-curved-path-with-constant-acceleration-magnitude-of-displacement-distance-covered-is.

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Include a doi in the reference. Check out <http://www.thomsonscientific.com/cgi-bin/jrnlst/jloptions.cgi?PC=D>, Science Citation Index Expanded.

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Heading 0

Heading 0 is not used very often. You use it when you want to divide a large document into major parts, each part having several chapters.

Heading 1 is often used for chapters.

# Heading 1

This is an example of the formatting for a Heading 1 or chapter.

Note with the current release of Open Office, 3.3, you will need to manually set the font for Heading 1 to Heading 1 Char.

## Heading 2

Here is the format of a Heading 2 tag.

### Heading 3

Example of Heading 3

p — Paragraph

Lines Start — Non paragraph text

Lines — Non paragraph text

Lines End — Non paragraph text

Paragraphs

List list list  
liddy lidy

#### Heading 4

An example of Heading 4.

##### Heading 5

An example of Heading 5

###### Heading 6

An example of Heading 6

Heading 7

An example of Heading 7

Heading 8

An example of Heading 8

Heading 9

An example of Heading 9

# General Lists

## Simple, unordered, ordered lists

For example, here is a simple list.

List 1 Start

List 1

List 1

List 1 Cont.

List 1

List 1

Here is the hierarchical view of the 5 levels of simple lists.

List 1 Start

List 1

List 1 Cont.

List 1

List 2 Start

List 2

List 2 Cont.

List 2

List 3 Start

List 3

List3 Cont.

List 3

List 4 Start

List 4 Cont.

List 4

List 5 Start

List 5

List 5 Cont.

List 5

List 4

List 3

List 2

List 1

Simple List Example

bread

butter

cheese

bananas

End of Simple List Example

Unordered lists are similar.

Here’s an example of an unordered list:

Formatted Example

* This is an item in an unordered list. To separate it from other items in the list. The is a bullet beside it.

This item consists of two paragraphs. This paragraph does not get a bullet because it is not a separate list item.

* This is a separate list item in our unordered list.

End of Formatted Example

The tags for an unordered list:

Formatted Example

* Bullet 1 Start

Bullet 1 Cont.

* Bullet 1

End of Formatted Example

Here is the hierarchical view of the 5 levels of unordered lists.

* Bullet 1 Start
* Bullet 1

Bullet 1 Cont.

* Bullet 1
* Bullet 2 Start
* Bullet 2

Bullet 2 Cont.

* Bullet 2
* Bullet 3 Start
* Bullet 3

Bullet3 Cont.

* Bullet 3
* Bullet 4 Start

Bullet 4 Cont.

* Bullet 4
* Bullet 5 Start
* Bullet 5

Bullet 5 Cont.

* Bullet 5
* Bullet 4
* Bullet 3
* Bullet 2
* Bullet 1

An ordered list is numbered with formatting that supports up to 99 items.

Ordered List Tag Usage

1. Numbering 1 Start
2. Numbering 1
3. Numbering 1

Numbering 1 Cont.

1. Numbering 1
2. Numbering 1

End of Ordered List Tag Usage

Full Ordered List Usage

1. Number 1 Start
2. Number 1

Number 1 Cont.

1. Number 1
2. Number 2 Start
3. Number 2

Number 2 Cont.

1. Number 2
2. Number 3 Start
3. Number 3

Number3 Cont.

1. Number 3
2. Number 4 Start
3. Number 4

Number 4 Cont.

1. Number 4
2. Number 5 Start
3. Number 5

Number 5 Cont.

1. Number 5
2. Number 5
3. Number 4
4. Number 3
5. Number 2
6. Number 1

End of Full Ordered List Usage

Formatted Example

1. Cream butter and sugar together until fluffy.
2. Beat in egg yolks one at a time.
3. Add nutmeg, cinnamon, and vanilla, and mix thoroughly.
4. Add flour and beat for five minutes. The batter should be smooth and glossy and stream off the spoon in ribbons.
5. Fold in beaten egg whites.

Do not overmix; the batter should be light and fluffy.

End of Formatted Example

Definitional list are a particular kind of list you can use when you want to pair a term or phrase with a description of it.

Here’s an example of a definition list without a heading:

Formatted Example

| gopher | A burrowing rodent that feeds on roots of plants. |
| --- | --- |
| lawn | Gopher highway.  Can be identified by dinner-plate-sized mounds of dirt where grass used to be. |
| agapanthus | Lovely flowering plant, the roots of which are the preferred food of gophers.  If your flourishing agapanthus suddenly keels over, it means a gopher has had a feast. |

End of Formatted Example

The description of paragraph tags:

| Paragraph Tag | Description |
| --- | --- |
| DL | High Level Paragraph for Hierarchical View |
| DLdthd | Identifies the heading wanted for the definition term column. |
| DLdt Start | Identifies the first definition term for lists without headings. |
| DLddhd | Identifies the heading wanted for the definition description column. |
| DLdd Start | Identifies the first definition description for lists without headings. |
| DLdt | Identifies a definition term. It will have a DLdd tag associated with it. |
| DLdd | Identifies a definition description. Is will be associated with a corresponding DLdt tag. |

Here’s an example of a definition list with a heading:

Formatted Example

| Amusement Park Area | Facilities |
| --- | --- |
| Veldt | Elephant ride, lion safari, nature walk, snack bar, rest rooms. |
| Jungle | Monkey ride, tree swing, snack bar, rest rooms, first aid station. |
| Desert | Camel ride, oasis cafeteria, rest rooms. |

End Formatted Example

#### Text that isn’t paragraphs

#### Just plain lines

Lines Start — Non paragraph text

Lines — Non paragraph text

Lines — Non paragraph text

#### Examples of computer input and output

Examples of computer input and output are easy; you just begin them with an XMP Start tag followed with XMP tags.

Examples of computer input and output:

XMP Example

10 LET A = B

20 IF A GT B THEN GO 40

30 LET A = C

40 PRINT A, C

End of XMP Example

#### Example phrases

xph: The system will respond with a READY message.

Acronyms as also special highlighting .This is an acronym, fortran This

### Figures

Figure Example

The figure caption is placed underneath the figure content.

1. Example of an inline figure.

Figure Description.

End of Figure Example

Wide Figure Example

The figure caption is placed underneath the figure content even with wide figures.

1. Example of a wide figure.

This is an example of a wide figure description.

End of Wide Figure Example

#### Reference keys

There are times when you need to refer to labels — usually numbers — on item in a picture or graphic. Because the picture itself is not under control of Open Office, there is no way to use the automatic cross-reference tools. In this case, you use the Ref Key Char tag.

Formatted Example

1. Pull out the ON button, 1, on the display
2. When the system signature appears on the screen, press the CLEAR button, 2, on the keyboard.

End of Formatted Example

#### Title citations

Tags for title citations (Citation) are used to highlight titles.

Formatted Example

Have you read Gone With the Wind?

End Formatted Example

#### Notes

There are several ways to handle notes.

If the note is a single paragraph use the Note paragraph tag.

If the note is greater than a single paragraph, use the Note tag for the first paragraph followed by the Note Cont. paragraph tag.

If you have a list of notes, use the Notes, Notes Start, Notes End, Notes Cont., and Notes Head tags.

Example of Note tag

NB: This is an example of a Note tag.

End of Example

Example of Note and Note Cont. Tags

Note: When automated line composition began to replace hand line composition, the hyphenation technology was such that many hyphenation errors occurred. (This paragraph is tagged with the Note tag.)

When hyphenation is suppressed, justification, especially in narrow columns produces egregious “rivers” in the text. The solution to this problem was to suppress justification. (This paragraph is tagged with the Note Cont. tag.)

End of Example

Example of Note List

Note List Heading: (Notes Head)

1. The Notes list items begins with the Notes Start tag.

You can add an unnumbered paragraph with the Notes Cont. tag.

1. The subsequent Notes list items are tagged with the Notes tag.

End of Example

#### Long quotations

Excerpts or long quotations are indented according to traditional publishing stytle for information quoted from another source. The paragraph tag is LQ.

Long Quotation Example

The shipping guidelines say:

Packages weighing more than 20 pounds must arrive in the mailroom before 2:30 PM if they are to be shipped the same day. If packages are to be shipped air freight, they require an authorization signed by a manager.

Packages that are to be shipped overseas must be submitted to the mailroom with the proper customs clearance forms filled out.

Please comply with these guidelines.

End Long Quotation Example

### Tables

Tables consist of cells, arranged in rows. Here is a simple example:

Formatted Example

1. A simple example.

This is the description of a simple table.

|  |  |  |
| --- | --- | --- |
| Row 1, Column 1 | Row 1, Column 2 | Row 1, Column 3 |
| Row 2, Column 2 | Row 2, Column 2 | Row 2, Column 3 |
| Row 3, Column 3 | Row 3, Column 3 | Row 3, Column 3 |

End of Formatted Example

Let’s look at another example — one that’s a bit more filled out:

Formatted Example

A bigger sample table.

Here’s a bit of a table description that you might find useful.

|  |  |  |  |
| --- | --- | --- | --- |
| Column Head 1 | Column Head 2 | Column Head 3 | Column Head 4 |
| Row 1, Column 1 | 1. Row 1 2. Column 2 | Row 1, Column 3; here’s a little more text than the other cells have. | Row 1, Column 4 |
| Row 2, Column 2 | Row 2, Column 2 | Row 2, Column 3  Here is a short example. | Row 2, Column 4 |
| This paragraph is inside a table. | Row 3, Column 2 | Row 3, Column 4 | Row 3, Column 4 |

End of Formatted Example

Formatted Example

1. Full table tag usage.

This table uses most of the table tags.

|  |  |  |  |
| --- | --- | --- | --- |
| Table Head Left | Table Head Center | Table Head Center | Table Head Right |
| Table Cell Left | Table Cell Left | Table Cell Center | Table Cell Right |
| Table Cell Left | Table Cell Left | Table Cell Center | Table Cell Right |
| Table Cell Left | Table Cell Left | Table Cell Center | Table Cell Right |
| Note: This is an example of a table note. | | | |
| Table Foot Left | Table Foot Left | Table Foot Center | Table Foot Right |

End of Formatted Example

#### Messages and Codes

| Paragraph Tag | Description |
| --- | --- |
| MSGno | Message number |
| MSG | Message text |
| MSGxpl | Explanation |
| MSGseverity | Severity |
| MSGmodule | Module |
| MSGprod | Problem Determination |
| MSGuresp | User Response |
| MSGpresp | Programmer Response |
| MSGspresp | System Programmer Response |
| MSGoresp | Operator Response |
| MSGsysact | System Action |
| MSGnumbytes | Number of Error Bytes |
| MSGdest | Destination |

#### Processing perils: Caution, Warning, Danger

We must sometimes alert users to a risk of possible damage to equipment or data, machines, or themselves. For these situations, we have three paragraph tags ― Caution, Warning, and Danger. There are also three character tags ― Caution Head, Warning Head, and Danger Head.

Warning: Unit must be unplugged before this adjustment is made.

Danger: Unit must be unplugged before this adjustment is made.

Caution: Unit must be unplugged before this adjustment is made.

#### Qualifying Information

When you have to qualify information as applying to a particular product or system in a book about multiple products or systems, there are several techniques you can use.

One, of course, is simply to say, “if you are using Model 9, then ….” Another method, for major differences, is to put some qualification in the section heading.

Still another method is to use a formatting convention such as the one provided by the Qualif (qualifying information) tag. This tag is suitable for qualification at the level of a paragraph or list item or greater. It is not suitable for a single-phrase qualification or for qualifications of many pages.

There are both Qualif/Qualif End and Qualif Wide/Qualif End tag sets.

Formatted Example

The Qualif tag sure is handy.

End of Formatted Example

#### Labeled Box

The labeled box paragraph tag is LBLbox.

Labeled Box

Labeled boxes have two fundamental uses:

Labeled boxes provide special highlighting for important information that you want to make sure that your readers don’t overlook.

To provide a formatting convention for the presentation of information, such as the syntax of programming statements.

All in all, labeled boxes are an effective presentation of certain kinds of information.

However; if you use them for a specific purpose, such as a syntax presentation, it is probably not a good idea to also use them for emphasis in the same document.

Paragraph

Abbreviation

Paragraph

Abstract

This is an appendix example.

This is an example of another appendix.

T

# Colophon

|  |  |
| --- | --- |
| Software | Word 2016, Version 16.0.7.7167.2040 MathType 6.9 |
| File Format | application/vnd.openxmlformats-officedocument.wordprocessingml.document+xml application/vnd.openxmlformats-officedocument.wordprocessingml.template+xml |
| Note about the type | de Groot, Lucas. 2012. “Calibri.” Corporate. Microsoft Typography. May 17. <http://bit.ly/2bphFep>. |
| Revision Control | $Date: $ $Id: $ $URL: $ |

Abstract

Paragraph

Note: Now is the

Bibliography

Paragraph

Legend

Paragraph

Safety

Paragraph

Summary of Changes

Paragraph

Paragraph