

Thermodynamics of a flare related on-disk active region sigmoid

Dr. Sargam Mulay^{1,2}, Durgesh Tripathi², Helen Mason³

¹School of Physics and Astronomy, University of Glasgow, UK

²Inter-University Centre for Astronomy and Astrophysics, Pune, India

³DAMTP, Centre for Mathematical Sciences, University of Cambridge, UK



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Outline

1 Sigmoids

- Themes, colors and fonts
- Frame numeration and foot
- Aspect ratio
- Highlight current section
- Columns
- Images, videos and attachments
- Overlays: pause, visible, uncover, only
- Tables
- Text blocks, definitions, theorems and proofs
- Mathematical content

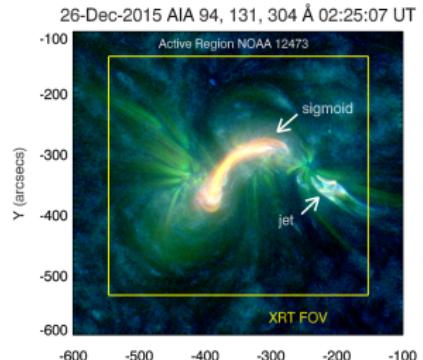
2 Presentation handout

- Handout option

Thermodynamics of a flare related on-disk active region sigmoid

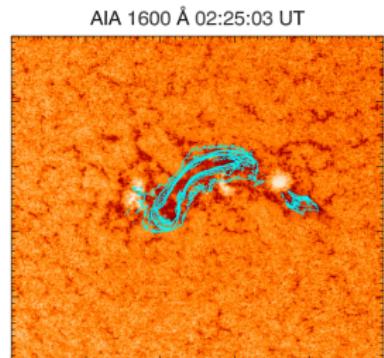
Sigmoids

- Show S-shaped (reverse S or two J-shaped) structure
- Highly sheared and twisted loops that are formed along the polarity inversion line
- Considered to be one of the best pre-eruption signatures



Research objective

- Investigation of temperature of a sigmoid during their lifetime on solar disk
- Relationship between sigmoids and solar flares
- How temperature of a sigmoid varies during the impulsive, peak and decay phase of flares



Mulay et al. in preparation for MNRAS

Data collection

- Using X-ray (Hinode/XRT) and EUV (SDO/AIA) imaging observations
- Full disk XRT images from the Solar Monitor website, XRT event archive
- On-disk sigmoids between $\pm 50^{\text{degree}}$ longitude - 2010 à 2018 - > 50 events

Methodology

- Temperature analysis using different methods such as
- Filter ratio – two XRT channels, AIA 94 and 131 Å channels, GOES X-ray fluxes from two filters
- Emission measure analysis using AIA observations – Cheung et al. 2015
- Study of Fe XVIII emission from AIA 94 Å channel (Del Zanna 2013)

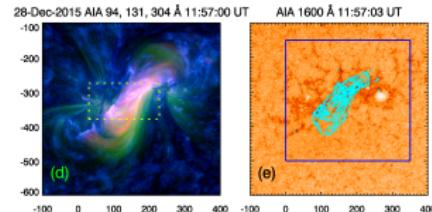
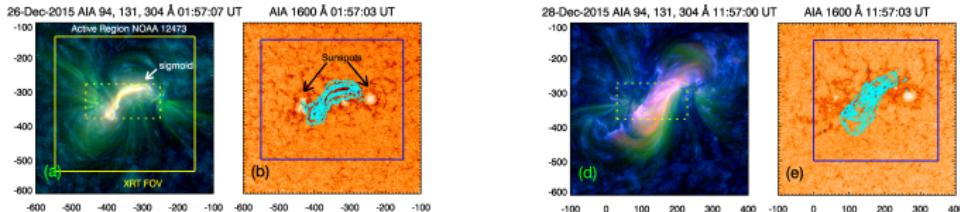
Sigmoid observation

- Dec. 24 - 28, 2015 – Sigmoid - NOAA AR 12473 - 4 B, 11 C and 2 M X-ray class
- Dec. 26, 2015 – C1.6 GOES flare - only brightening along sigmoid
- Dec. 28, 2015 – M1.8 GOES flare - sigmoid eruption

Introduction to Active Region Sigmoids

- Active regions often show S-shaped structures in the corona
- highly sheared and twisted loops that are formed along the polarity inversion line
- considered to be one of the best pre-eruption signatures

Sigmoid location in AIA, SOT and HMI images

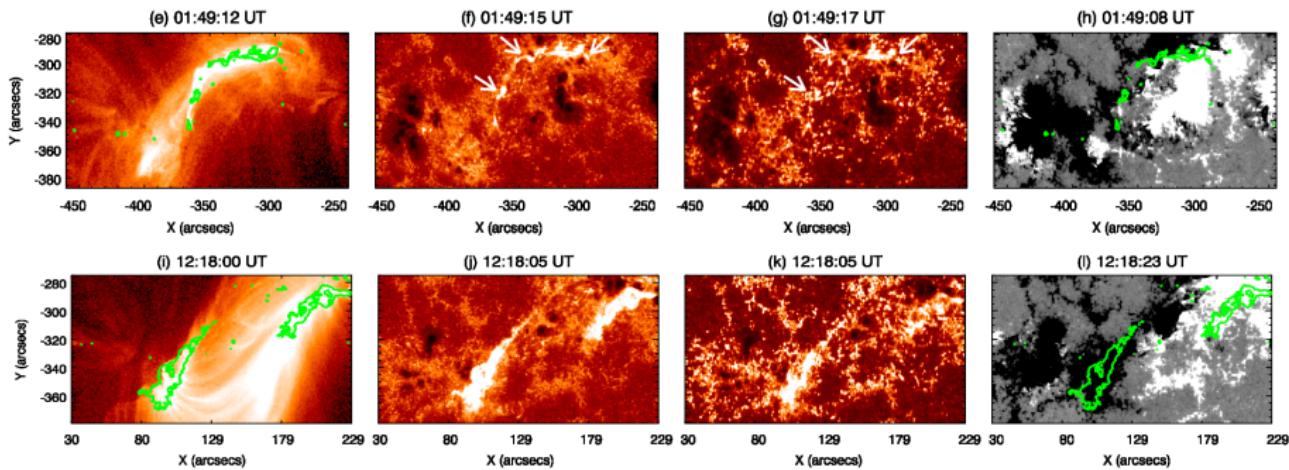


AIA 94 Å

SOT Ca II 3968 Å

AIA 1700 Å

HMI LOS \pm 100 G



Adjust 1x2 or 1x3 figures in a frame



(a) First subfigure



(b) Second subfigure

Figure: A figure



(a) Third subfigure



(b) Fourth subfigure



(c) Fifth subfigure

Figure: Another figure

2X2 figures



ID

Figure: foo



ID

Figure: foo



ID

Figure: bar



ID

Figure: bar

2X3 figures



Figure: foo



Figure: foo



Figure: foo



Figure: bar



Figure: bar



Figure: bar

Two columns - Text + figures

Some content here.

Some content here. Some content here.



Figure: Two line long caption



Figure: One line caption



Figure: One line caption



Figure: Two line long caption



Figure: Leslie Lamport and his TeXbook.

Background image with text

This is the title of the presentation

ABCD



Background image with text

Block Title

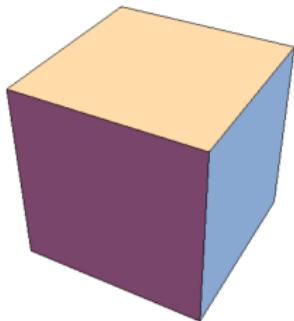
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.



This is the title of the presentation

ABD

Positioning a single image



$$\mathbf{H} = \frac{1}{2} (-\omega_m + \delta\lambda(x) \cos 2\theta_m) \sigma_3 - \frac{\delta\lambda(x)}{2} \sin \theta_m \sigma_1$$

— Shree Swami Samartha —

Different types of boxes

This is a framebox

This is a shaded text.

This is a shadowbox.

This is a doublebox.

This is a ovalbox.

This is an mdframed text with yellow Background.

Different types of boxes (cont.)

This is a boxed environment with `smein-transparent shadow`.

New title

This box uses a *boxed title*. The box of the title can be formatted independently from the main box.

Fit box (5cm)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

- This → that
- This ⇒ that
- This ⇒ that
- This ⇒ that

Rigid body dynamics

- Coriolis acceleration

$$\vec{a}_p = \vec{a}_o + \frac{^b d^2}{dt^2} \vec{r} + 2\vec{\omega}_{ib} \times \frac{^b d}{dt} \vec{r} + \vec{\alpha}_{ib} \times \vec{r} + \vec{\omega}_{ib} \times (\vec{\omega}_{ib} \times \vec{r})$$

Rigid body dynamics

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- Transversal acceleration

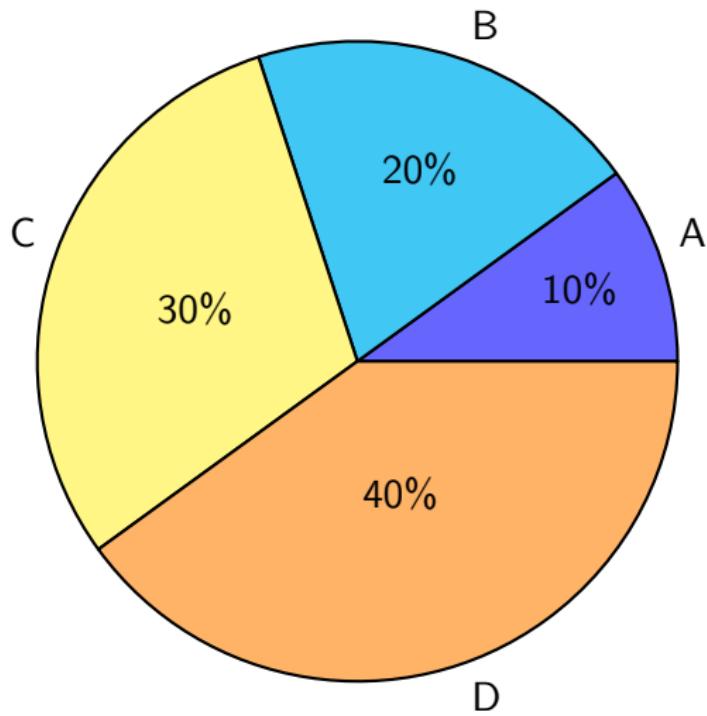
Rigid body dynamics

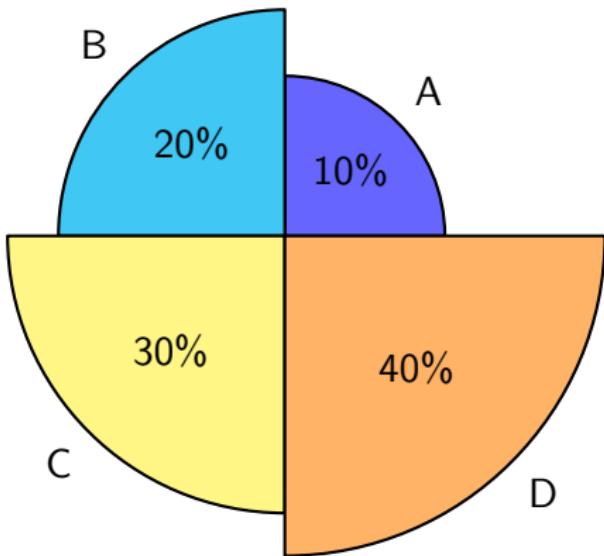
- Coriolis acceleration

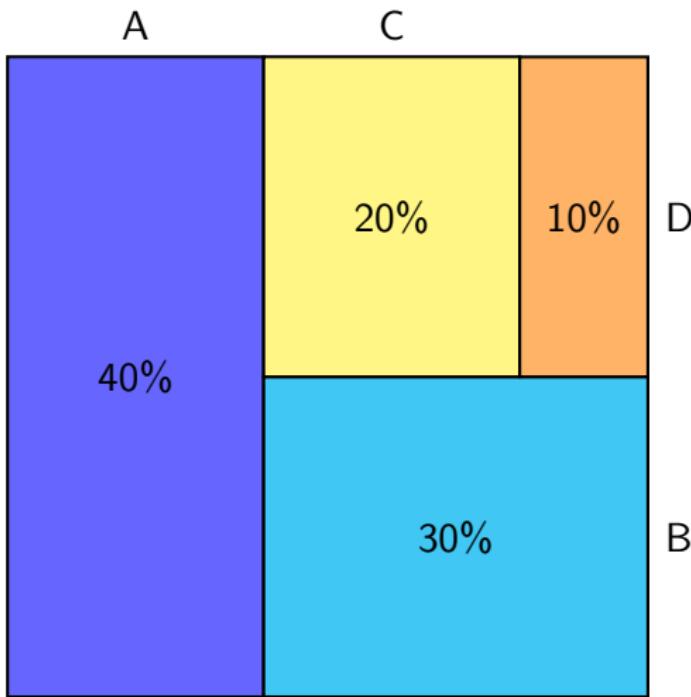
$$\vec{a}_p = \vec{a}_o + \frac{^b d^2}{dt^2} \vec{r} + 2\vec{\omega}_{ib} \times \frac{^b d}{dt} \vec{r} + \vec{\alpha}_{ib} \times \vec{r} + \vec{\omega}_{ib} \times (\vec{\omega}_{ib} \times \vec{r})$$

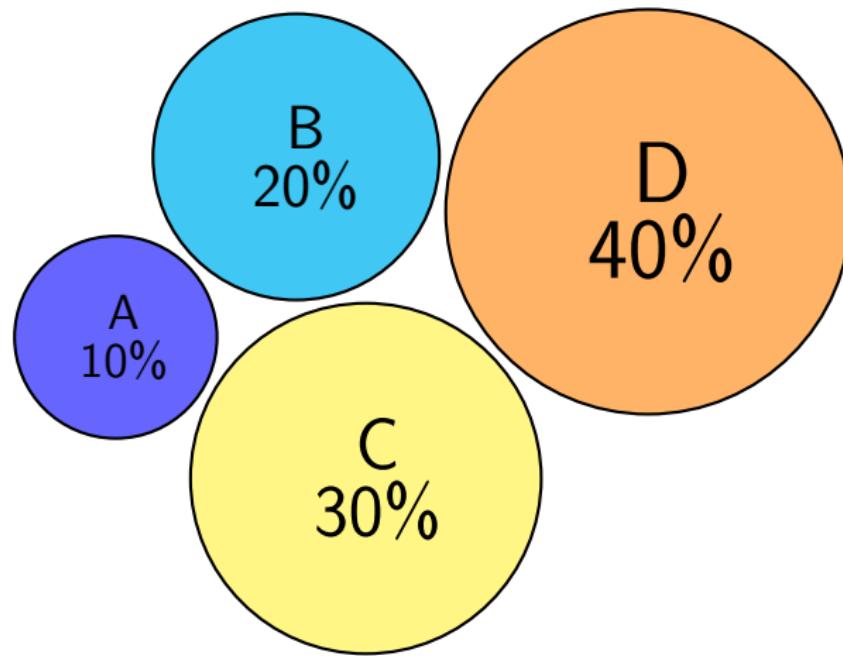
- Transversal acceleration

- Centripetal acceleration









Themes, colors and fonts

- Themes can be changed with the command `usetheme`.

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- The fonts can be changed with the command `usefonttheme`. A list of the different fonts can be found [here](#).

See the difference in this equation

$$f(x) = x^{2345} \sin(x). \tag{1}$$

Custom colors

You can also define your own colors with the commands `definecolor` and `setbeamercolor`.

Frame number

The frame number can be added to the bottom of the slide with the command `setbeamertemplate{footline}{frame number}`.

Foot

Alternative the foot of the presentation can be changed with further options for `setbeamertemplate{footline}`.

Aspect ratio

With `documentclass[aspectratio=169]{beamer}` you will create slides in 16:9 format.

Where are we?

Although most of the themes have a sidebar with the sections of the presentation, it is still for some people very useful to highlight the upcoming section and its contents.

Where are we?

Although most of the themes have a sidebar with the sections of the presentation, it is still for some people very useful to highlight the upcoming section and its contents. This can be achieved using the command `tableofcontents[currentsection]` just after the section definition.

Columns

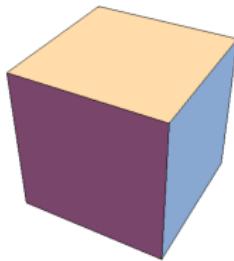
Columns can be used in order to separate content.

Some text in the first column. It
is important to see here that the
content in the columns are
aligned to the top. You can
choose t,c or b.

Some text the second column.

Embedding images

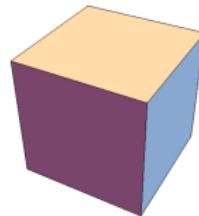
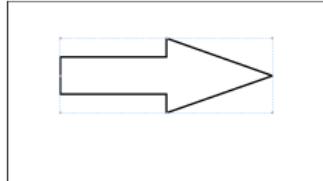
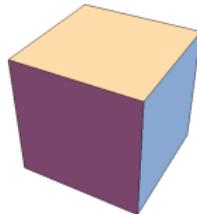
You may want to use different kind of images like PNG and EPS figures. In order to be able to work with EPS figures you need to adapt your compilation procedure. Here you can see a PNG figure.



For conversion of PNG figures into EPS search in Google for a converter or go [here](#).

Setting a link to a video

You are also able to link videos to the created PDF using the command **movie**.



A fantastic explanation on how to convert videos with the completely free VLC player can be found [here](#).

Other attachments

You might also want to show other attached files, e.g., [manipulate](#).

Overlays: pause

An itemized or enumerated list can be paused at several parts using the command **pause**, e.g.

Overlays: pause

An itemized or enumerated list can be paused at several parts using the command **pause**, e.g.

- first

Overlays: pause

An itemized or enumerated list can be paused at several parts using the command **pause**, e.g.

- first
- second

Overlays: pause

An itemized or enumerated list can be paused at several parts using the command **pause**, e.g.

- first
- second
- third
- fourth

Overlays: visible, uncover and only

If a more elaborated form has to be presented, use uncover and only.

Example:

Description of some concept

More Text.

Overlays: visible, uncover and only

If a more elaborated form has to be presented, use uncover and only.

Example:

Description of some concept

① Point 1

More Text.

Overlays: visible, uncover and only

If a more elaborated form has to be presented, use uncover and only.

Example:

Description of some concept

- ① Point 1
- ② Point 2
- ③ Point 3

More Text.

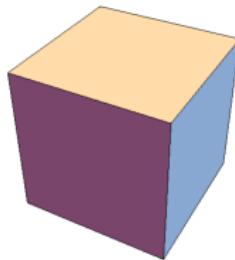
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Description of some concept

- ① Point 1
- ② Point 2
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More Text.

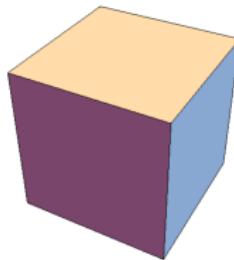
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Example:

Description of some concept

- ① Point 1
- ② Point 2
- ③ Point 3
- ④ Point 4



More Text.

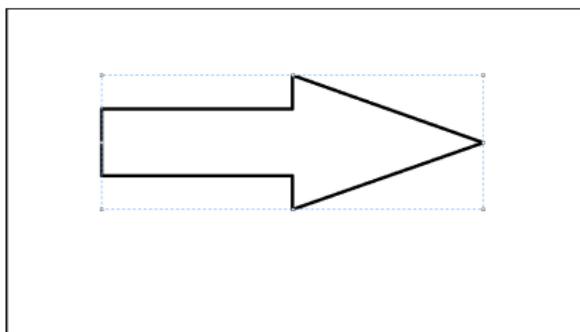
Overlays: visible, uncover and only

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Example:

Description of some concept

- ① Point 1
- ② Point 2
- ③ Point 3
- ④ Point 4



More Text.

Presentation of data

As in the other L^AT_EX documents you can also use here tables in order to present data.

	bla	ble	bli
first	sdfajfdlkÃ¶¶	sdjdklf	djk
second	sfd	fdgdfgds	dfgshgsdfh

Text blocks

You have the possibility to use the environment **block** for separating important content and concepts from the rest of the text.

Text blocks

You have the possibility to use the environment **block** for separating important content and concepts from the rest of the text.

Title of the concept

Description of the concept comes in this region. You are able to define more stuff in this region, e.g. equations

$$a + b = c \tag{2}$$

and more.

Text blocks

More blocks

Text blocks

More blocks

Definition (Name)

Description

Text blocks

More blocks

Definition (Name)

Description

Theorem (Name)

Description

Text blocks

More blocks

Definition (Name)

Description

Theorem (Name)

Description

Proof.

Proof



Mathematical content

Of course you are able to create also equations

$$m\ddot{x} = \sum_{i=1}^n F_i \quad , \quad \delta H = 0 \quad , \quad x(t) = \int_0^t v(s)ds \quad (3)$$

separately or in the text $f(x) = x^2$ using the common commands.

Table of contents

1 Sigmoids

2 Presentation handout
• Handout option

How to create a handout?

As you could see using the command `pause` a lot of PDF pages are created. May be you will want to give an handout of your presentation without the pauses. This can be done with the document class option `handout`. This will then ignore all pauses and a "reduced" PDF will be created.



[Goldbach, 1742] Christian Goldbach.

A problem we should try to solve before the ISPN â43 deadline,

Letter to Leonhard Euler, 1742.

and he can then add a citation:

Open Questions

Is every even number the sum of two primes? [1]