
# Pointers to Good Presentations

## Preparing a Scientific Presentation

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October 24, 2019

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# A Good presentation brings a change in our Audience

## 4 ways to bring that change

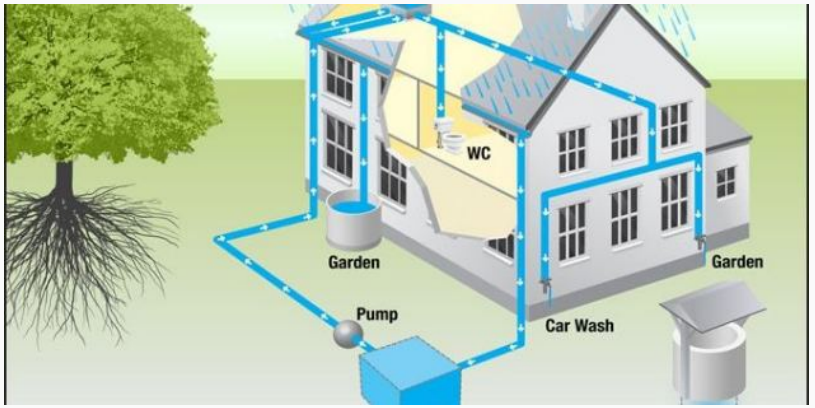
### Change in what they know

**Connecting to the Grid**

| State | Un-electrified households on Oct 10, 2017 | Households electrified since | Un-Electrified households as on date |
|---|---|---|---|
| Uttar Pradesh | 1,47,09,624 | 13,82,497 | 1,33,27,127 |
| Bihar | 38,74,284 | 6,76,174 | 31,98,110 |
| Other States | 1,79,56,351 | 29,47,532 | 1,48,40,755 |
| TOTAL (INDIA) | 3,65,40,259 | 50,06,203 | 3,13,65,992 |

Source: Saubhagya Dashboard, Union Ministry of Power

### Change in what they can do: Ability




[1]

[1] Source: https://5.imimg.com/data5/NC/UF/MY-7405152/rain-water-harvesting-500x500.jpg

# To Bring a change in our Audience

## Change in what they do

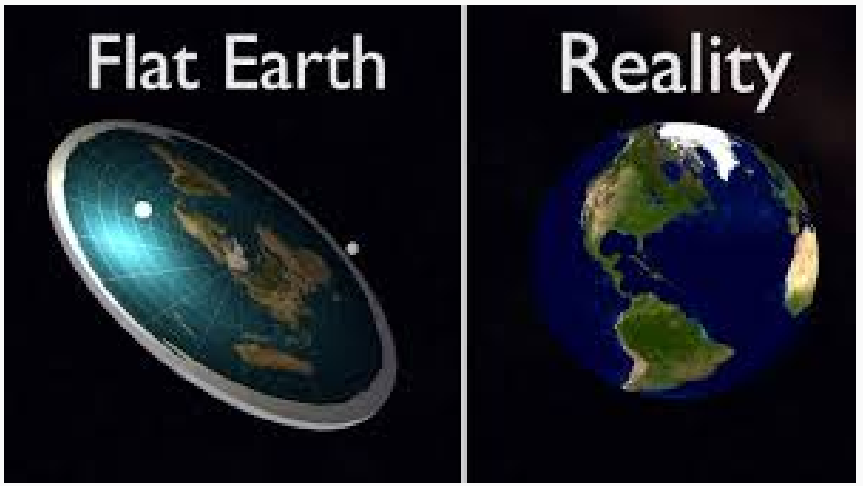
Listing 1: Plotting in Python

```
import numpy as np
import matplotlib.pyplot as pl

aa = 1.0
theta = np.arange(0,2*np.pi,0.01)
yy = aa*np.cos(theta)
pl.plot(theta, yy, 'r', lw = 3)
pl.show()
```

plot and $y = x^2$ curve

## Change in what they believe

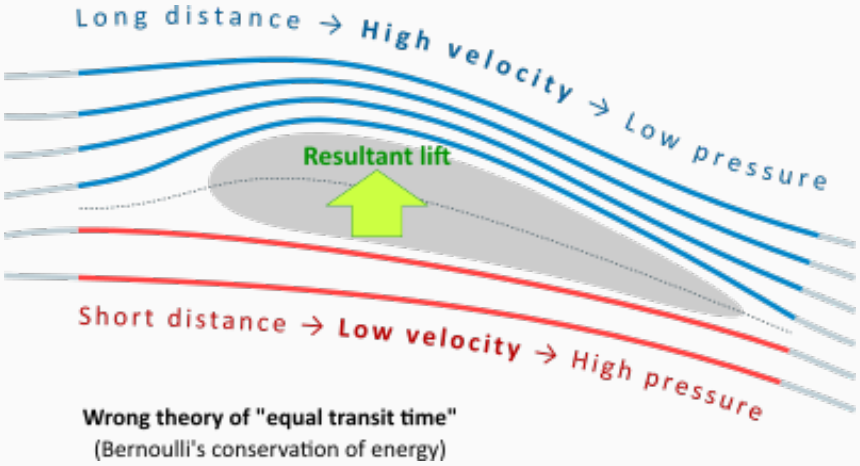



[2]

[2] Source: https://i.ytimg.com/vi/qkRnJutL5ko/hqdefault.jpg

# Changing Belief or Mythbusting: How does a wing really work

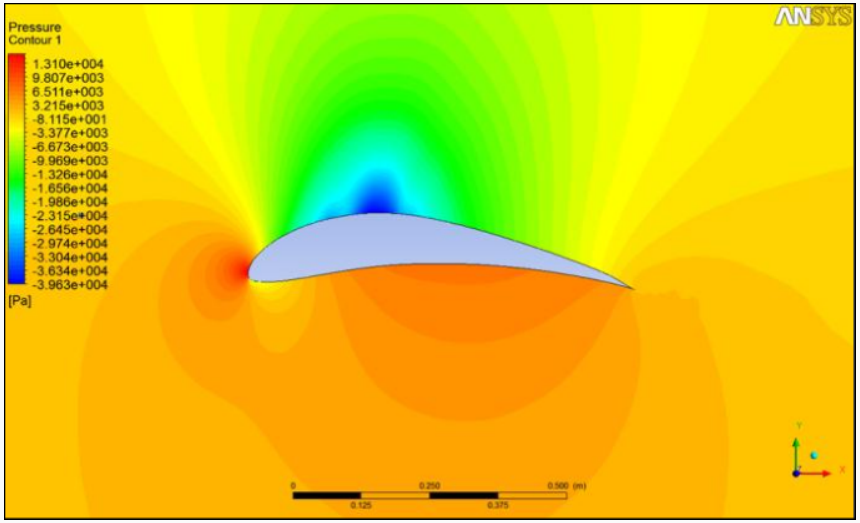
## Equal Transit time is wrong explanation




**Wrong theory of "equal transit time"**
(Bernoulli's conservation of energy)

3

## Shape: Curvature causes pressure differential




like a tornado Watch the Cambridge video:

**https://www.cam.ac.uk/research/news/how-wings-really-work**

[3] Source: **https://i.stack.imgur.com/xgvJC.png**

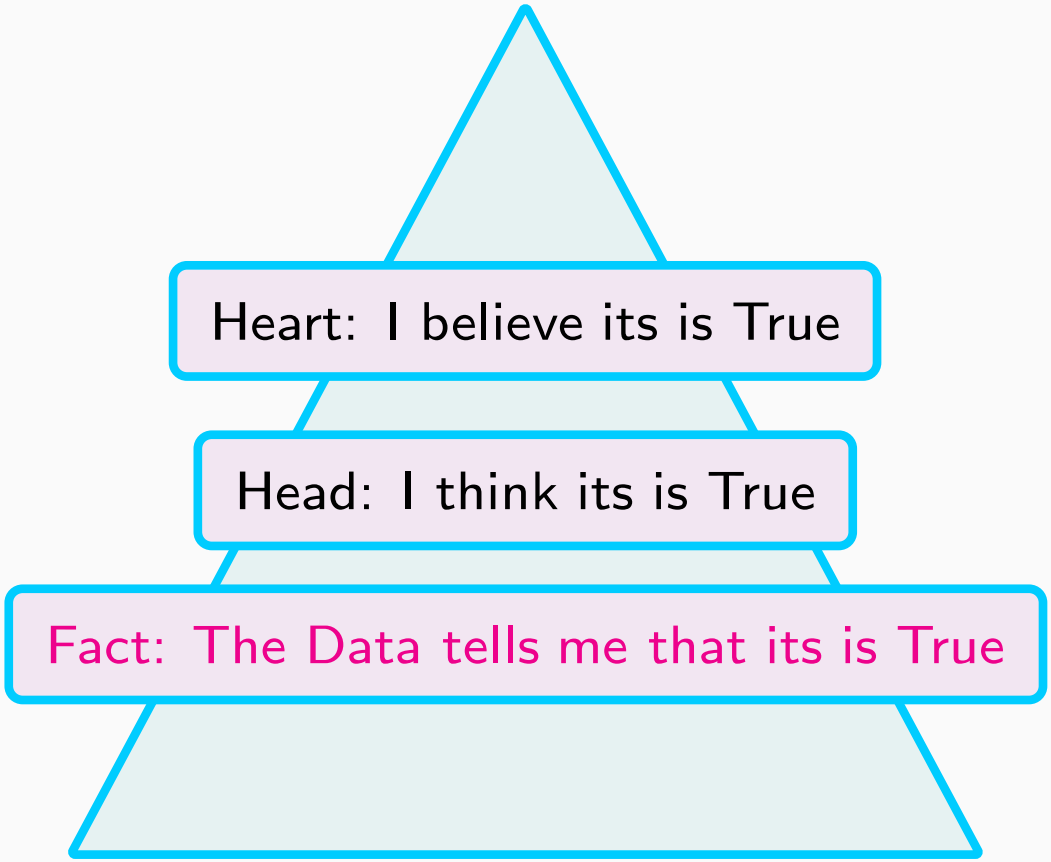
# 3 Principles by Don Roam (back of the napkin)

1. Lead with **truth** and heart will follow - Gives you confidence
2. Lead with a **story** and understanding will follow - Captures attention
3. Lead with the **eye** and the mind will follow - using visuals to capture attention

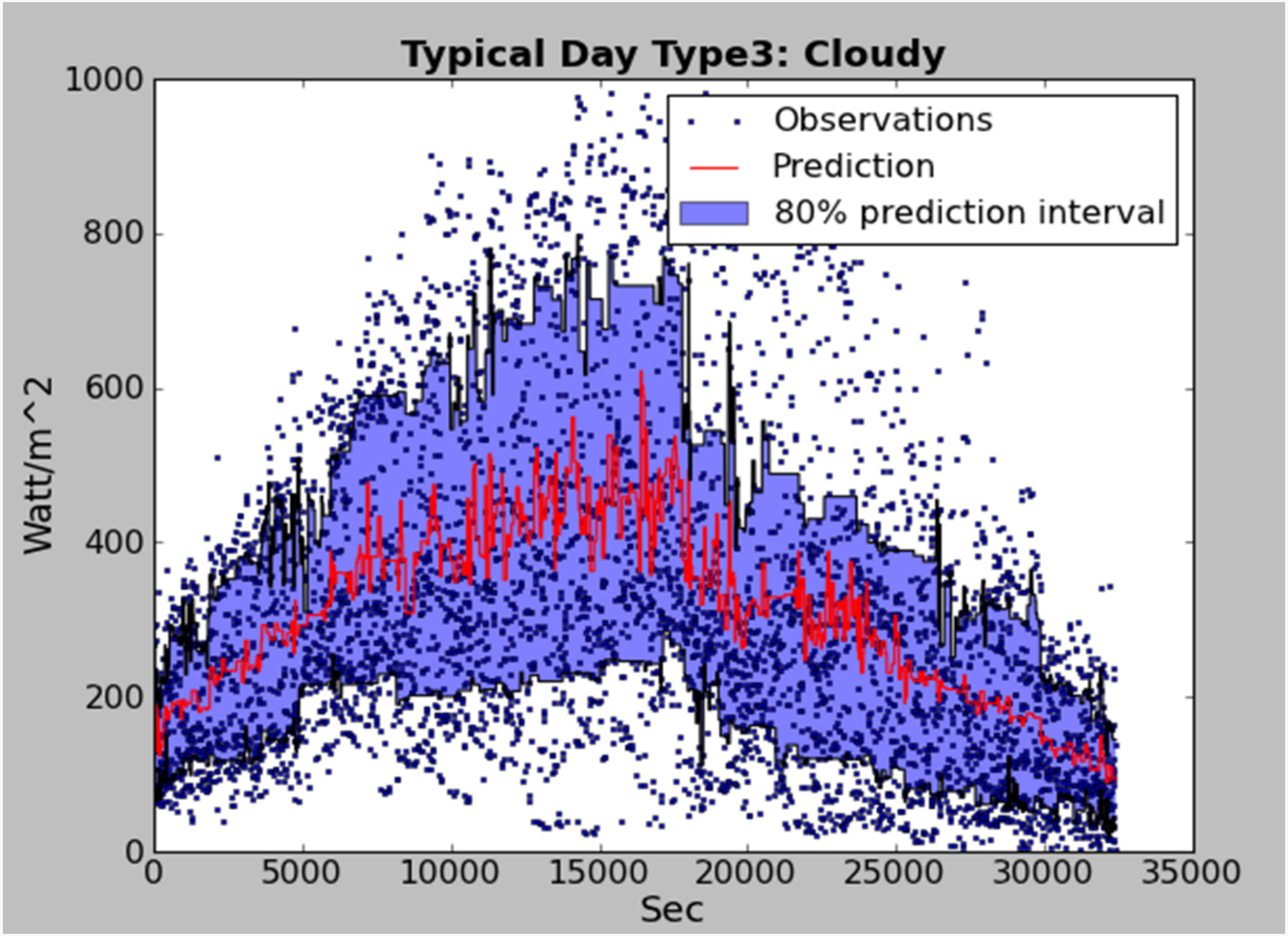
# Which Truth should I tell?

- Are you asking your audience to believe?
- Are you forcing your thinking on the audience?
- Are your enabling your audience to decide?

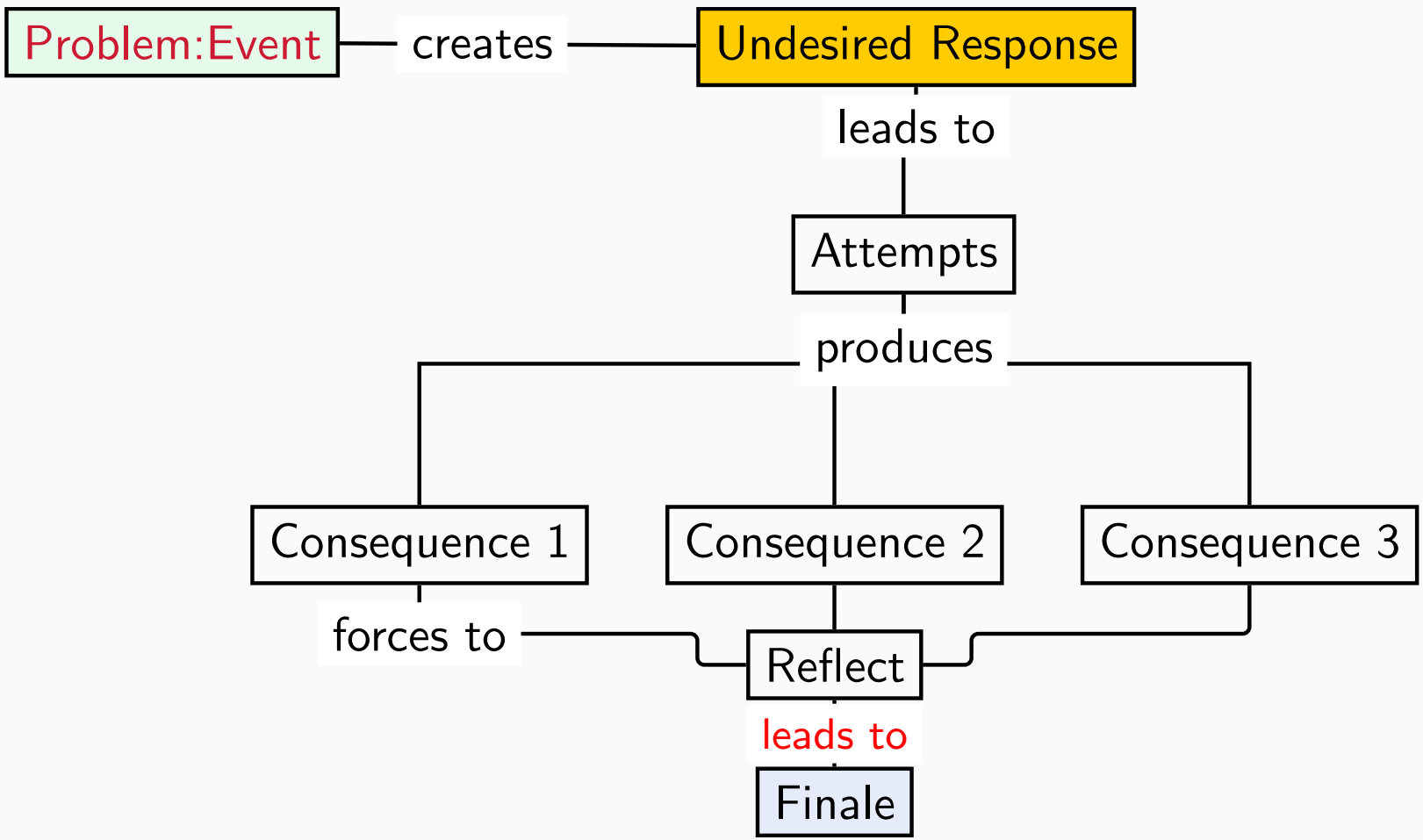
What do you think will have a greater impact



# Lead with truth: base your statements on facts

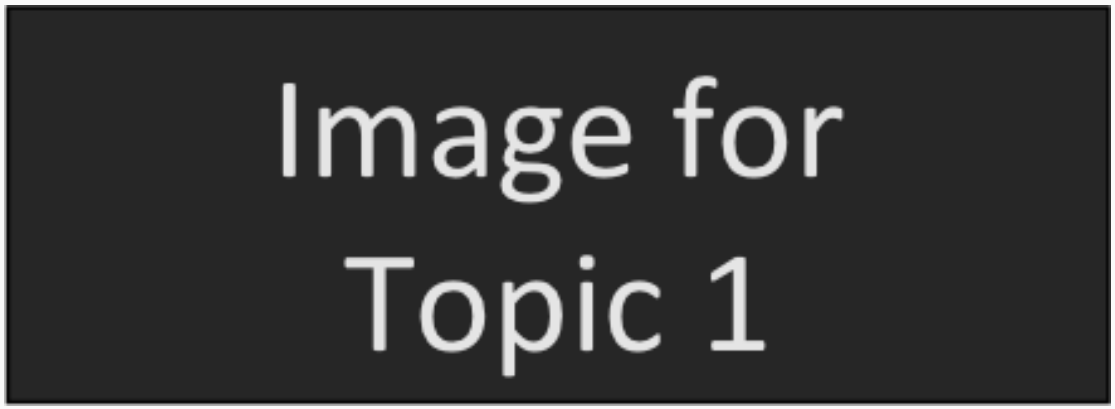


# A Story has a clear beginning and an end



# You have an exciting story to tell....hence the presentation

The Research Question

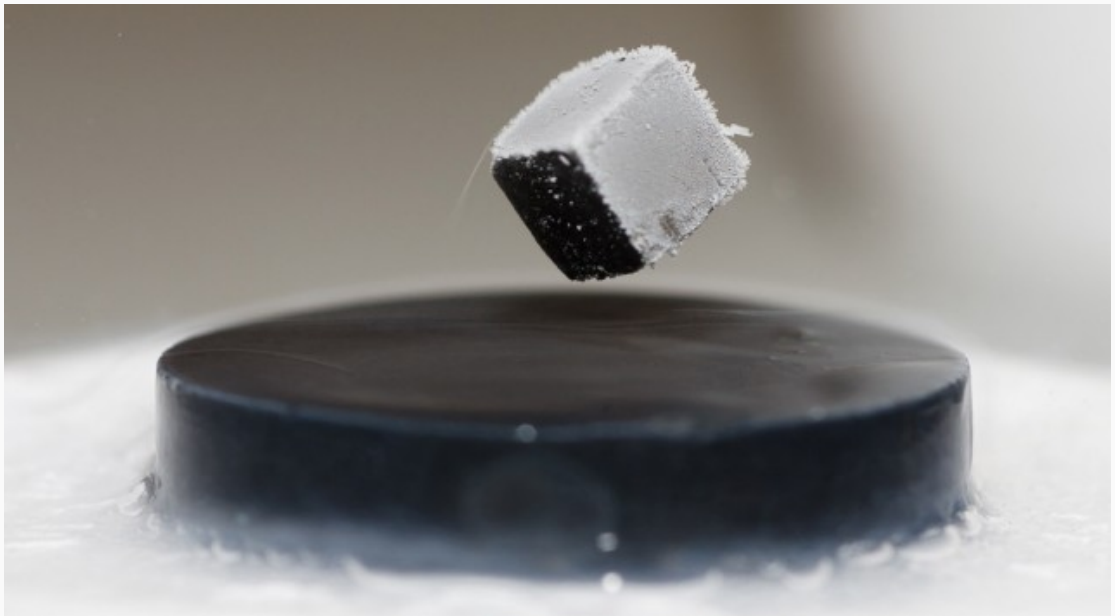


# Why does a superconducting material float over a magnet

## Say it with pictures

The Research Question

What happens to the magnetic field inside the superconductor?



4

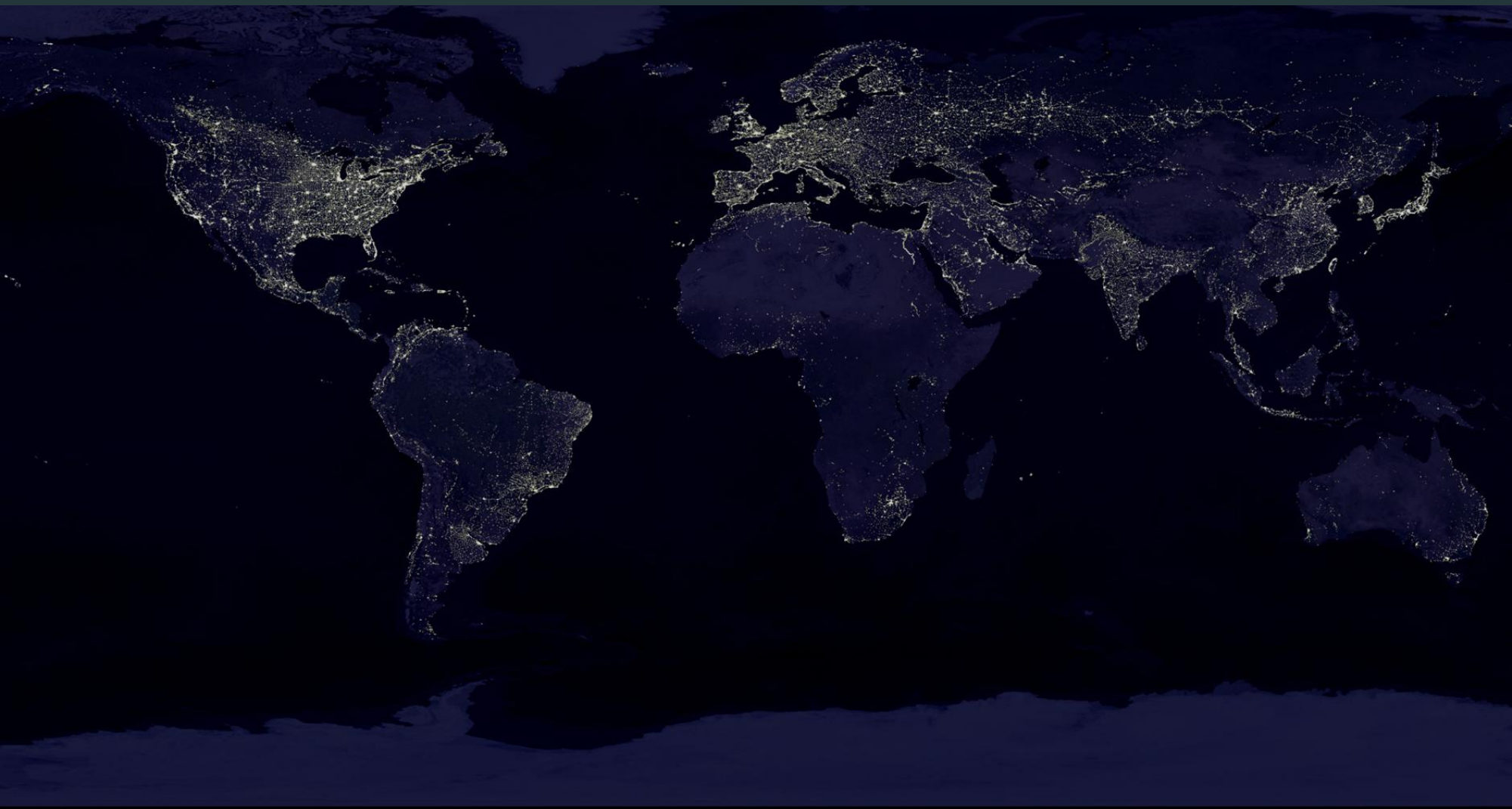
[4] Source: **Super Conducting levitation**

# Guess the title?

**A Picture speaks a thousand words** [5]

[5] Source: Earth at Night by NASA

# Development of a population has strong correlation to its electricity consumption



# Planning the introduction of a scientific talk

Breaking some rules here

- As a Speaker you are putting on a show...
- Your Audience expects a good story: A beginning.....middle.....an end.
- Talks should not be too long or too short
- Never overestimate your audience. Even experts like clear explanations. You want your audience to feel intelligent: "I understood what she was talking about"

# What is at stake for you?

You want to convey

- that you know your field
- that you have intellectual curiosity - Use rhetoric questions
- that you plan to convey some useful and interesting information
- Describe the big picture

Treat every talk as a job interview.

# Do not bore your audience with a table of content slide...unless

- Do not tie yourself to a rigid structure....
- But have an organic structure

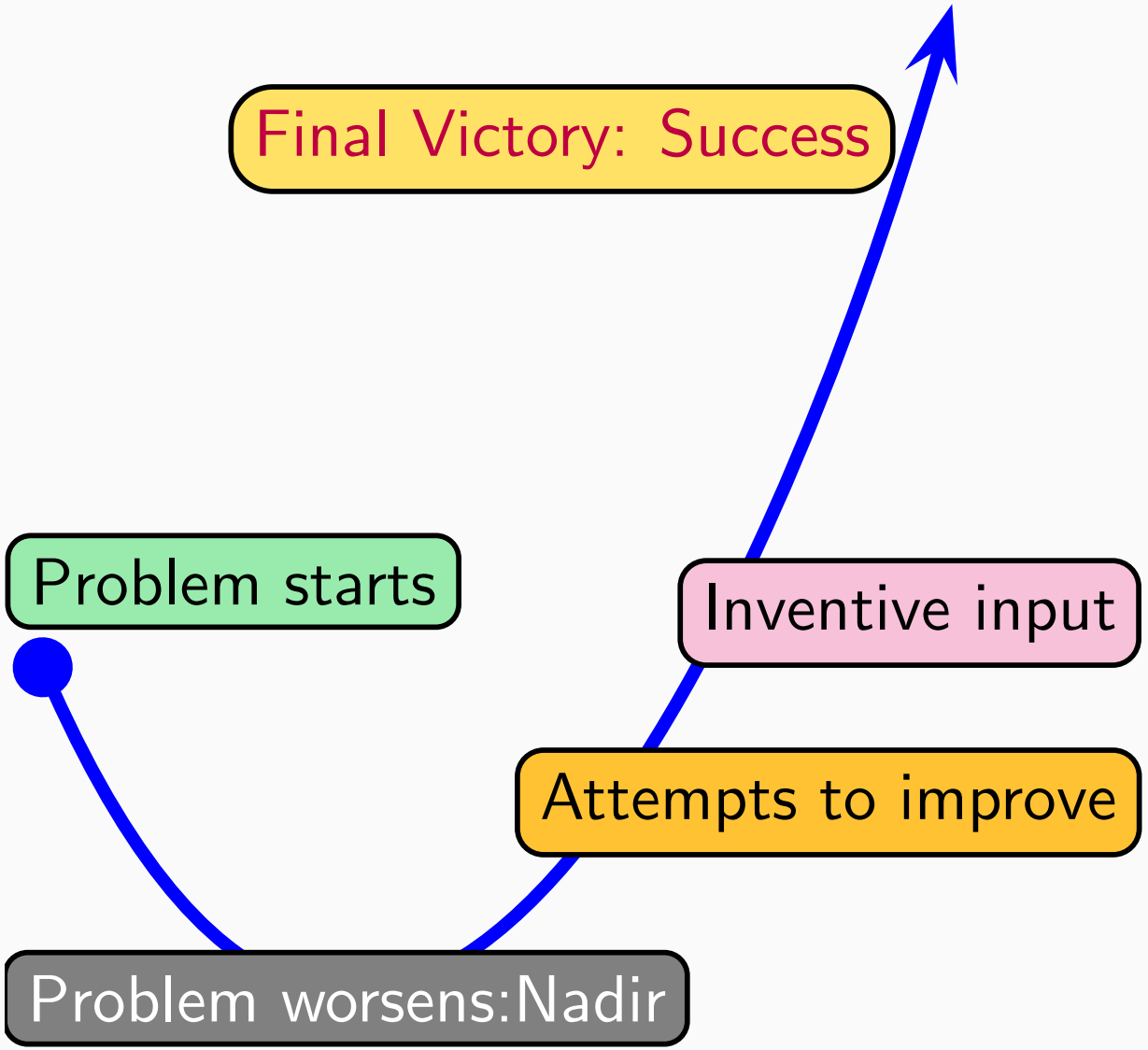
1. Introduction
2. Main equation
    1. Sub equation 1
    2. Sub equation 2
    3. Sub equation 3
3. Another equation
4. Yet another equation....
5. Experimental Set-up
6. Results
7. Conclusion

# 10 mins presentation with 7-8 slides..unless

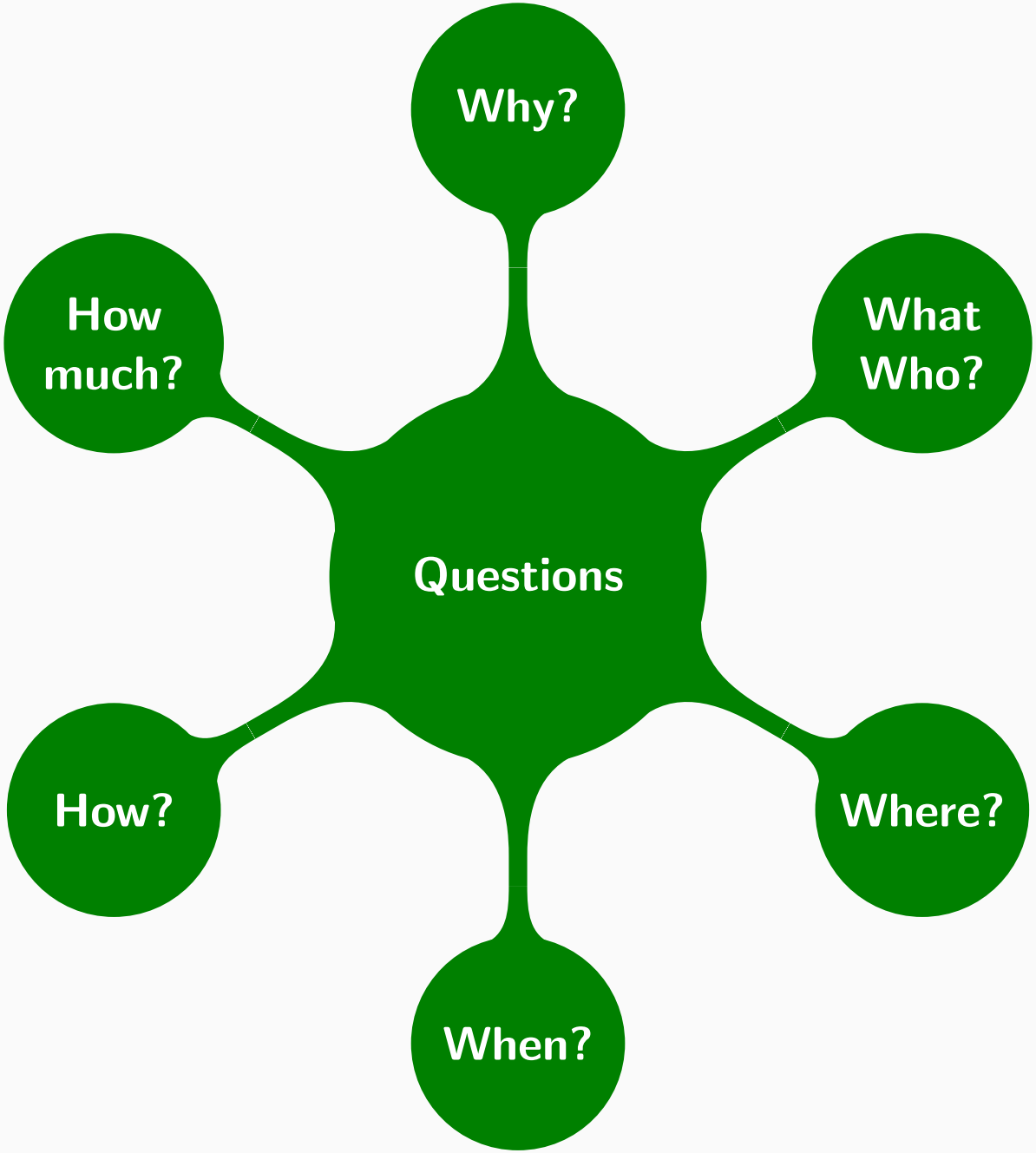
- Start story-boarding on paper...with pencil
- don't even think of touching the powerpoint (software)
- Technical Presentation will be 15 min + 5 min Q & A

# A Good Story line has a structure....Movies

- Problem occurs
- Conventional method makes problem worse
- Possible solutions
- Great idea propels
- Final victory...aims high



# Plan each slide based on which question your are answering



# A good presentation has a clear storyline

Change
How much?

Method
How?

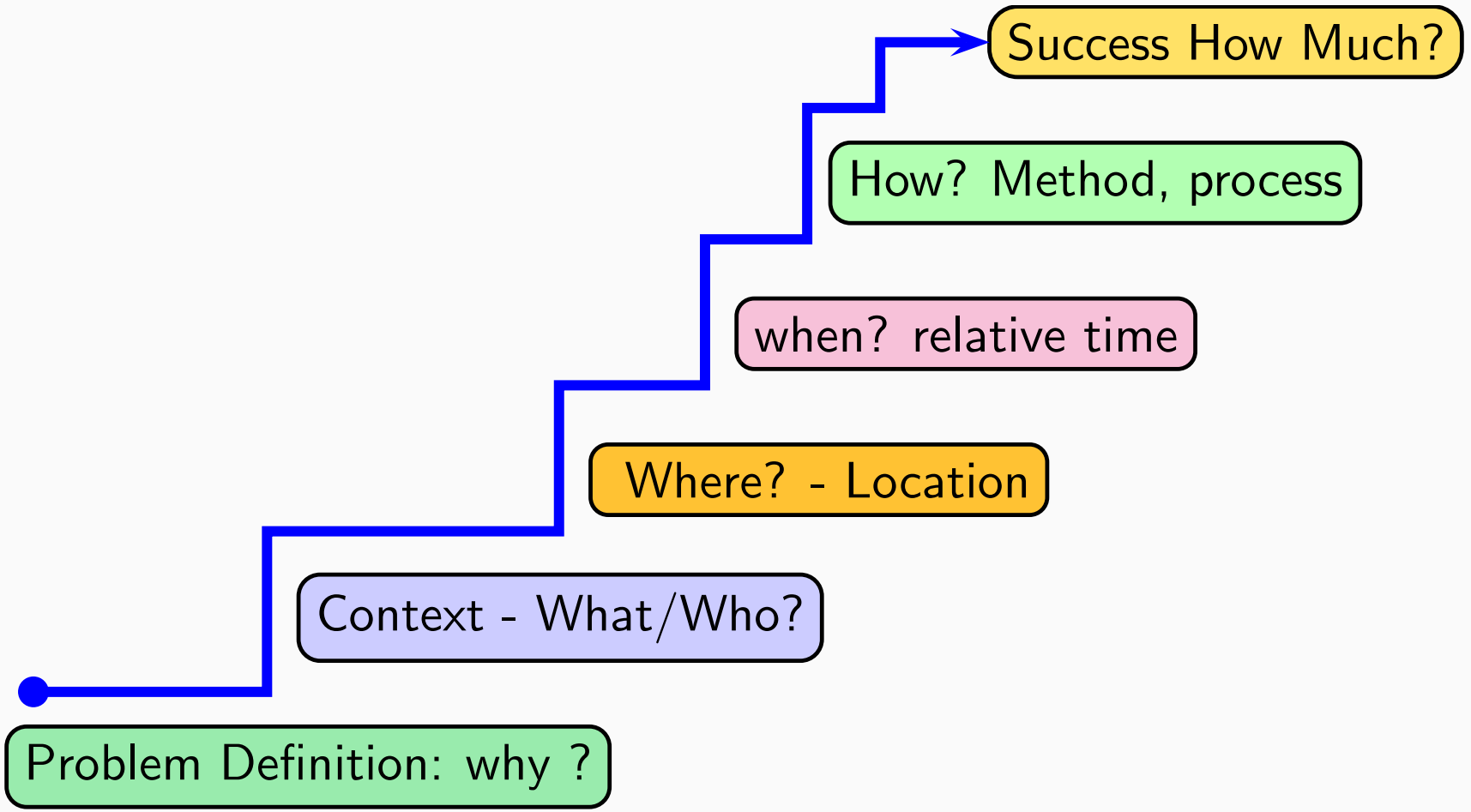
Movement
When?

Space
Where?

Context
What/Who?

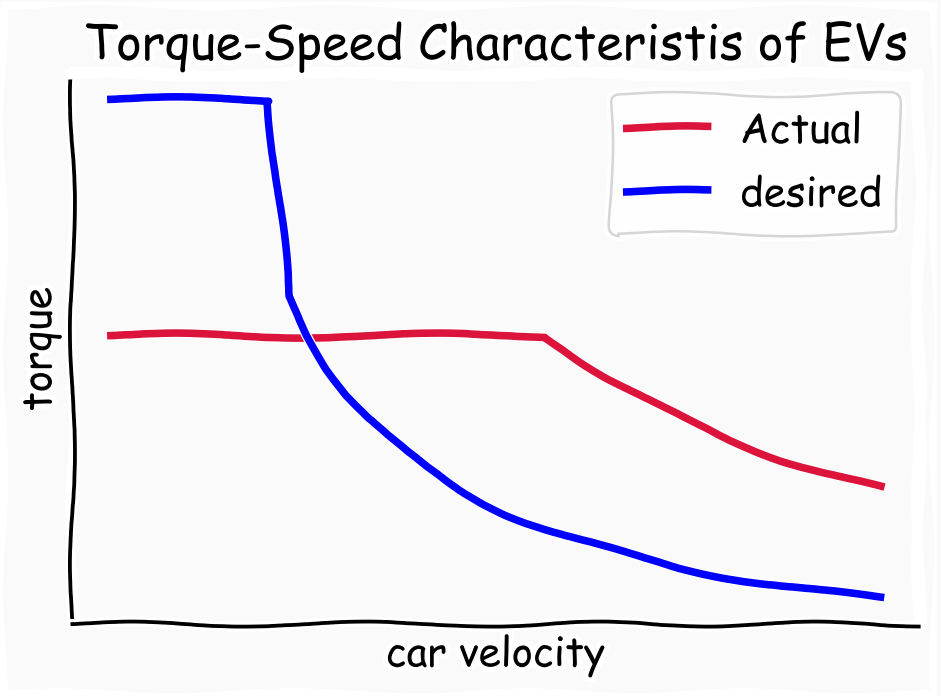
Problem
Why?

# Questions and Story Time line



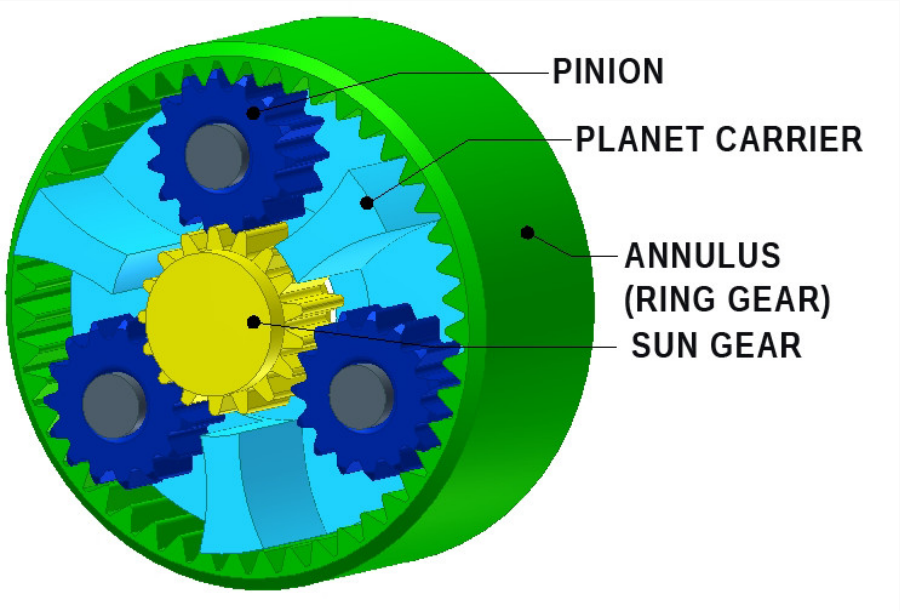
# Visuals for Questions: Why

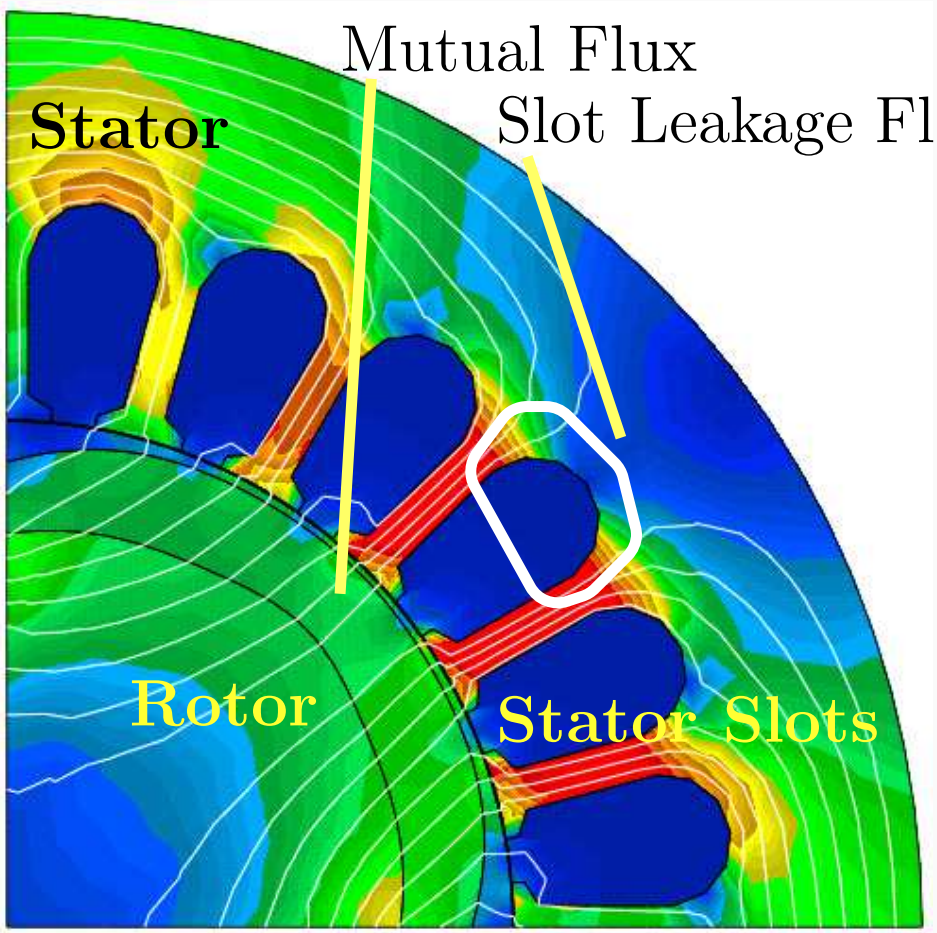
Output result $\neq$ Desired Results



# Visuals for Questions: What? Who

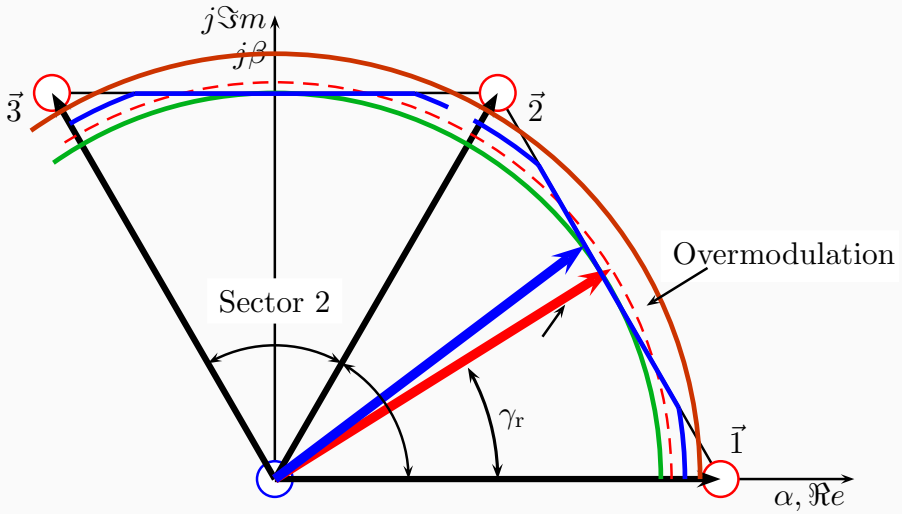
What



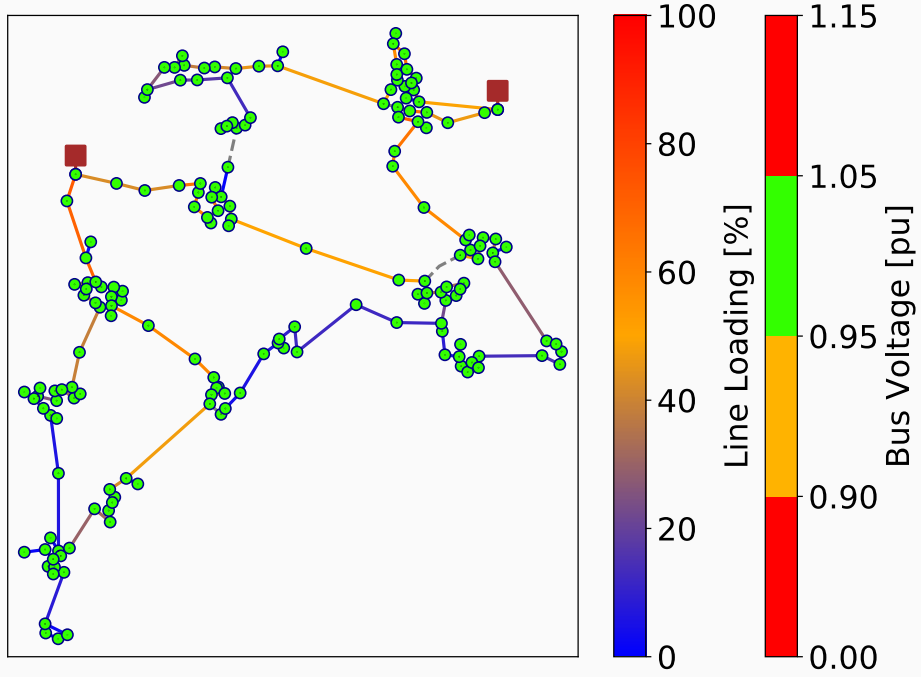



# Visuals for Questions: Where?

## Where in function diagram

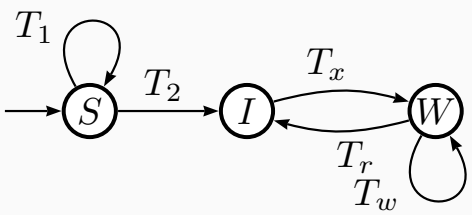


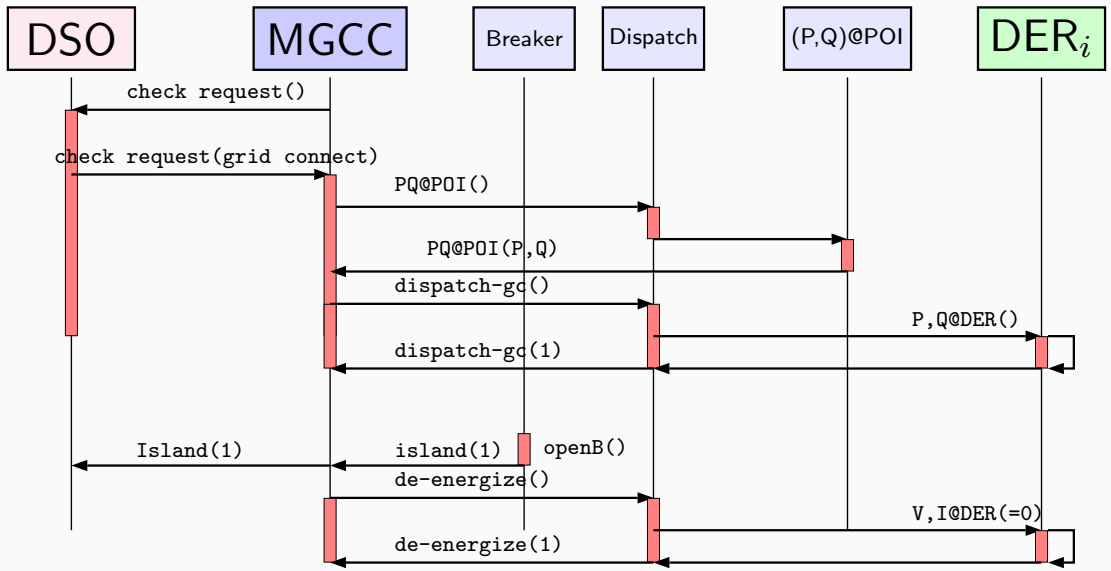

## Where in network?



# Visuals for Questions: When?

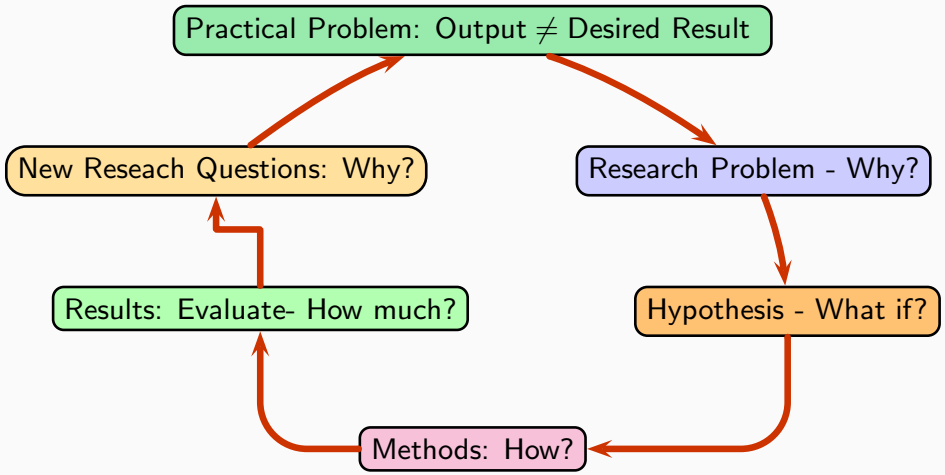
- Use time line (x-axis time)
- Show cause and effect - state machine



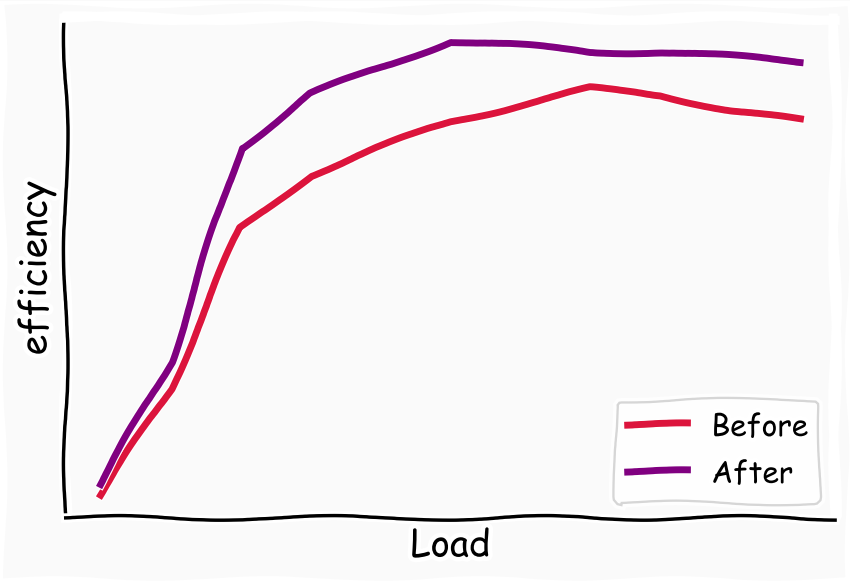



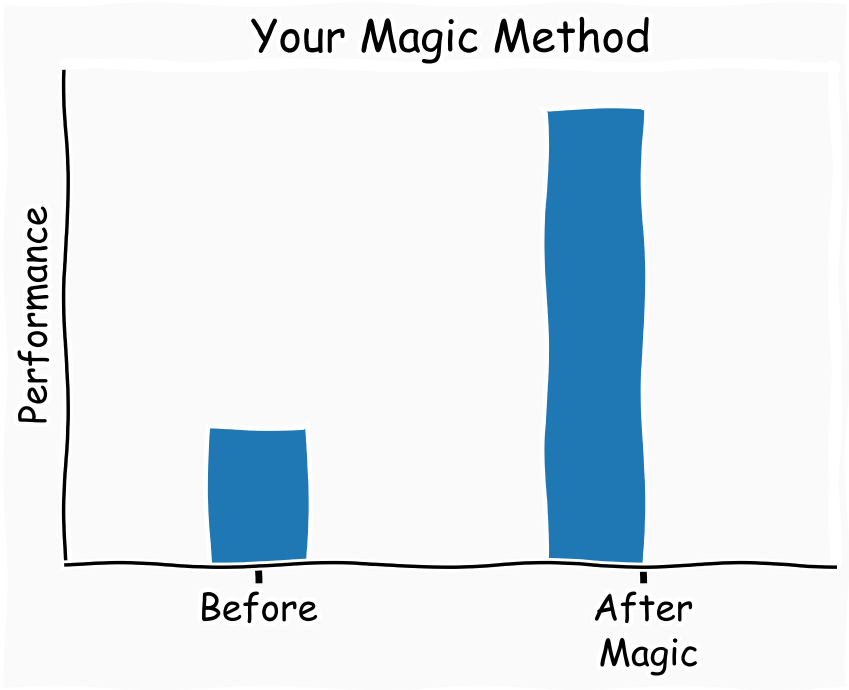
# Visuals for Questions: How?

- Usually describes a process
- Flow chart
- Process flow
- Cause and effect diagram



# Visuals for Questions: How Much?



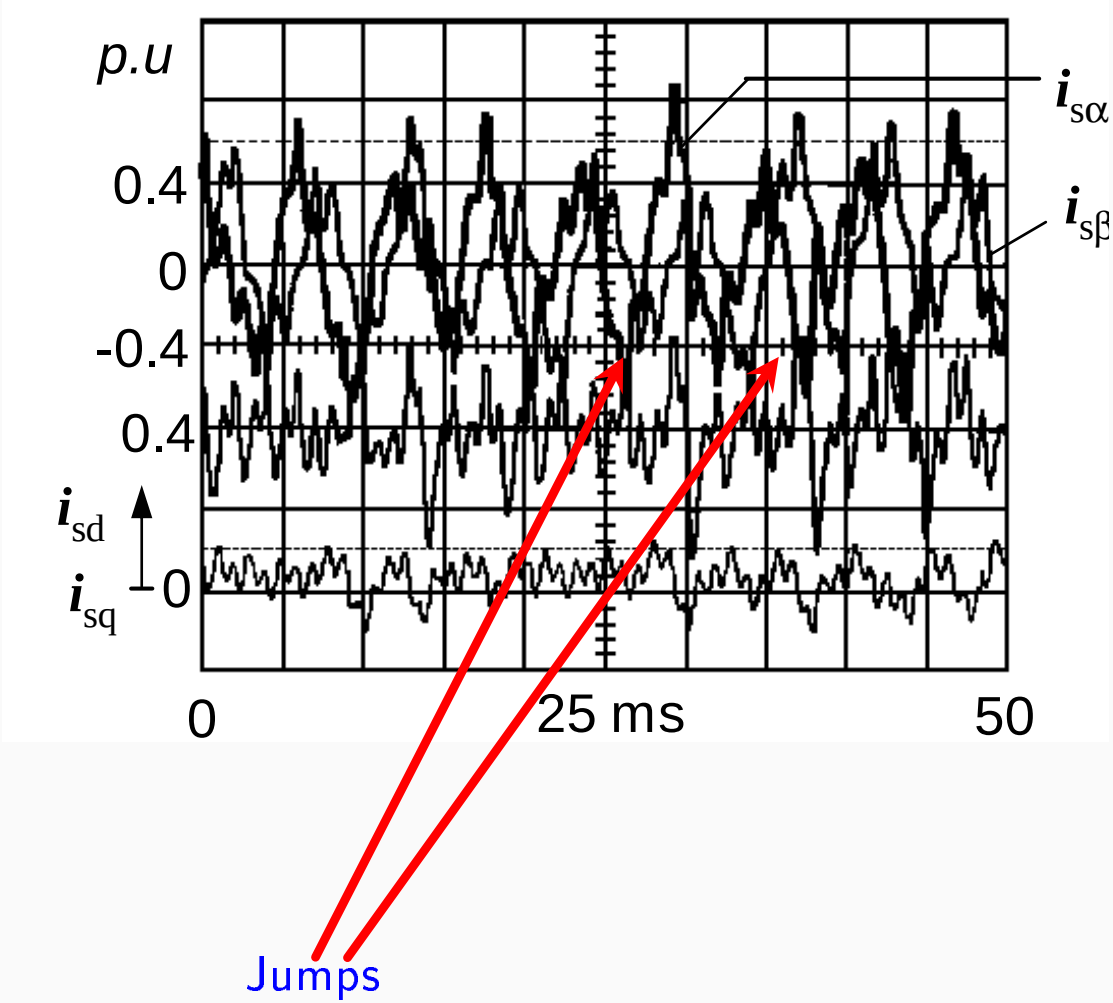
# Fast current control in Overmodulation region causes current transients

## Say it with pictures

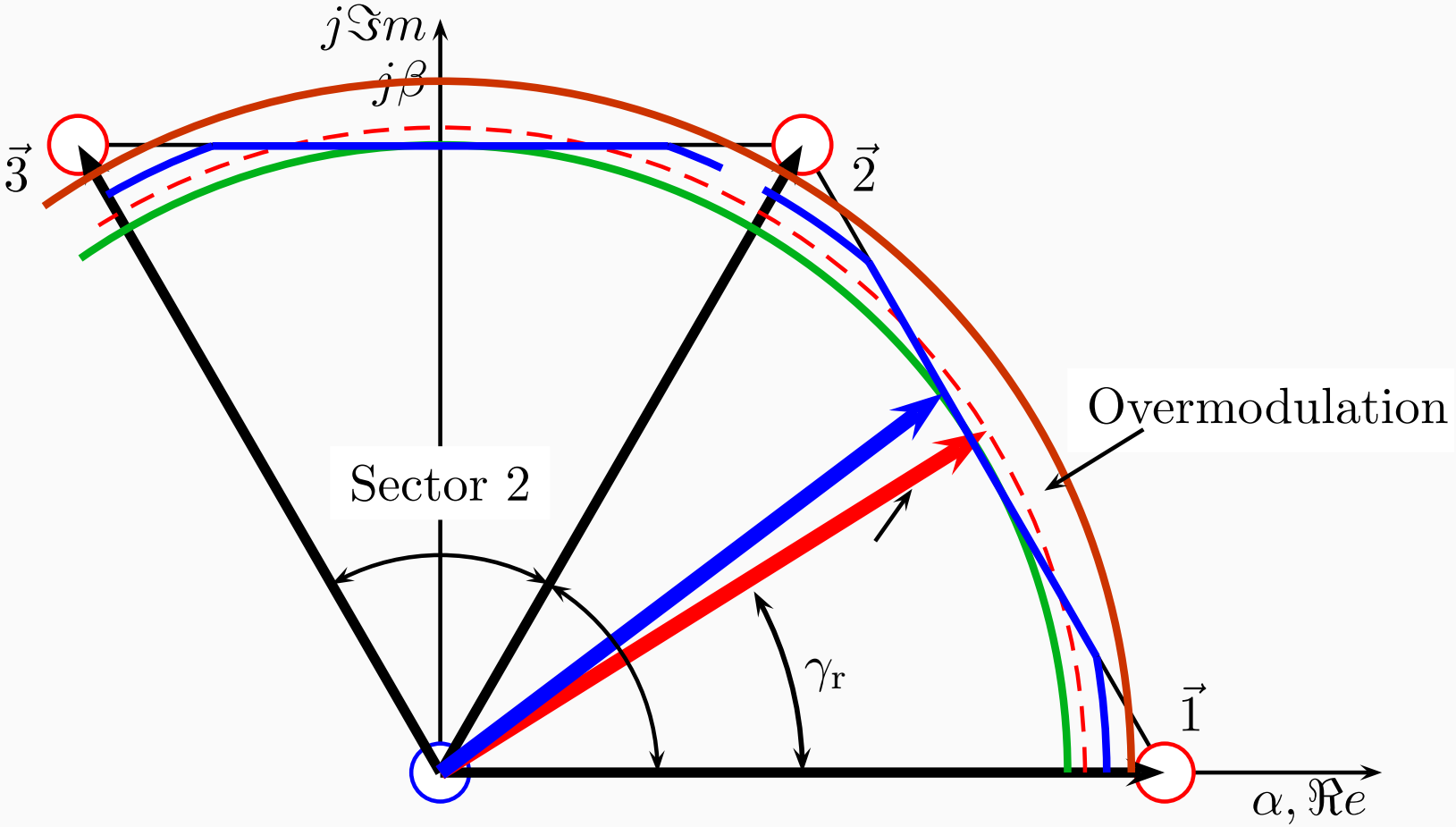
The Research Question

Current controller creates oscillations in overmodulation region

Why?



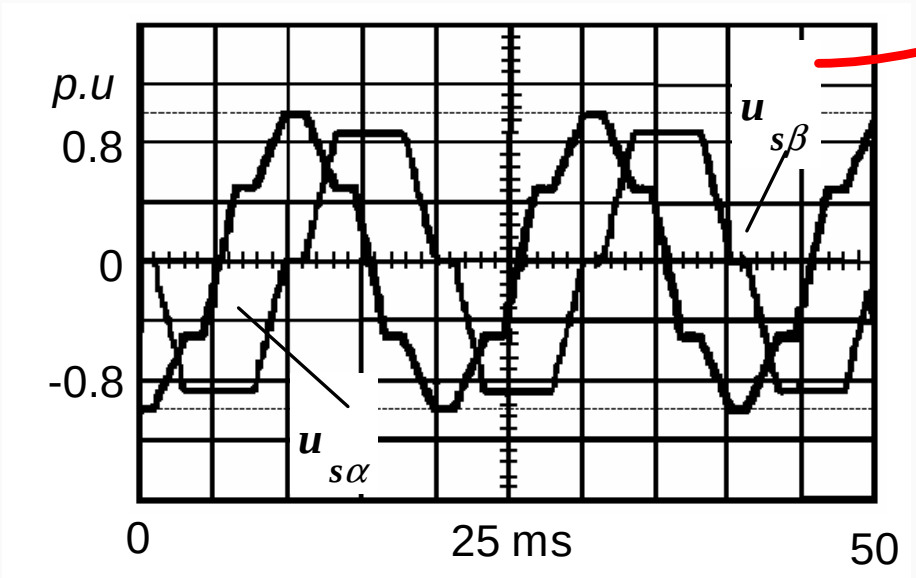
# Overmodulation is the operation in region between $0.90 < m < 1$ (What ?)



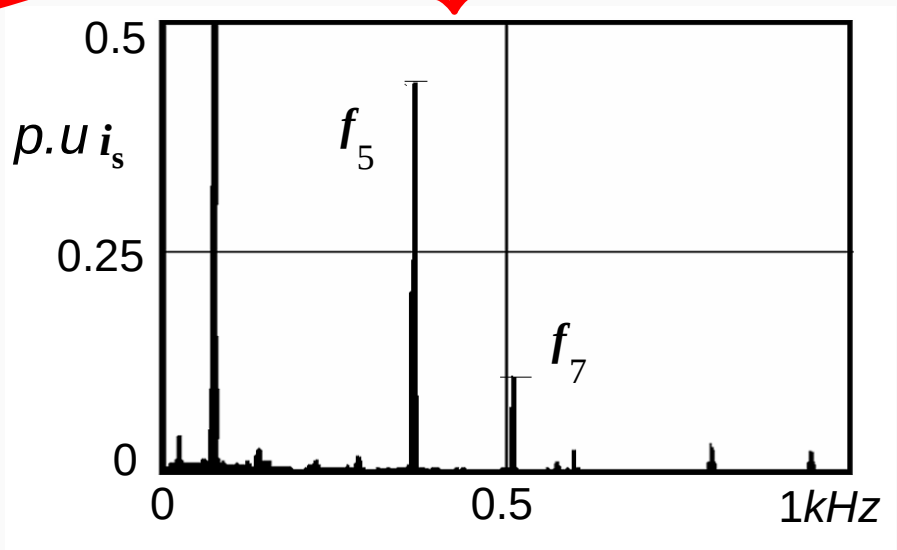

Overmodulation region

is between green circle $m = 0.905$ red circle $m = 1$

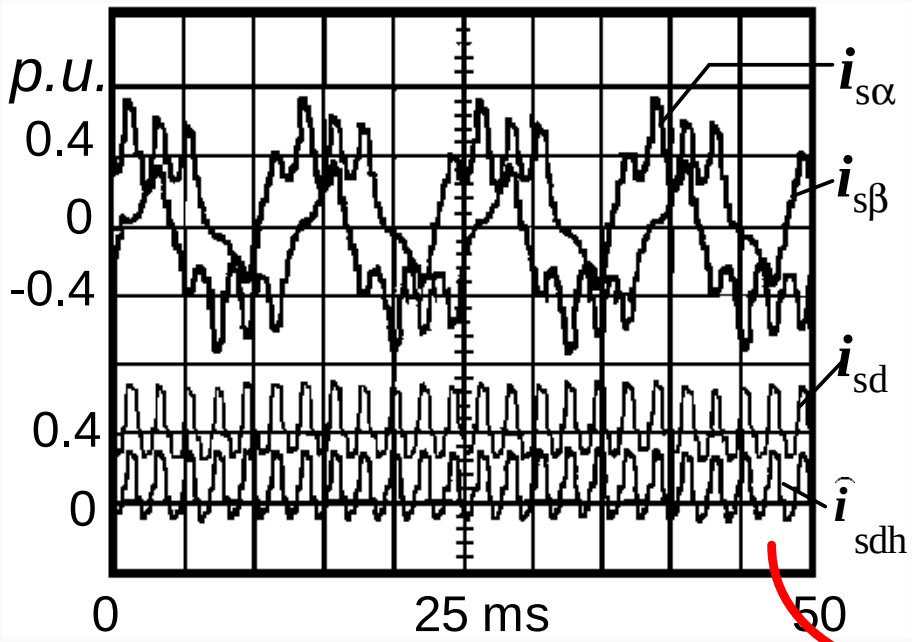
# When in overmodulation, voltage is non sinusoidal - 5th, 7th harmonics present

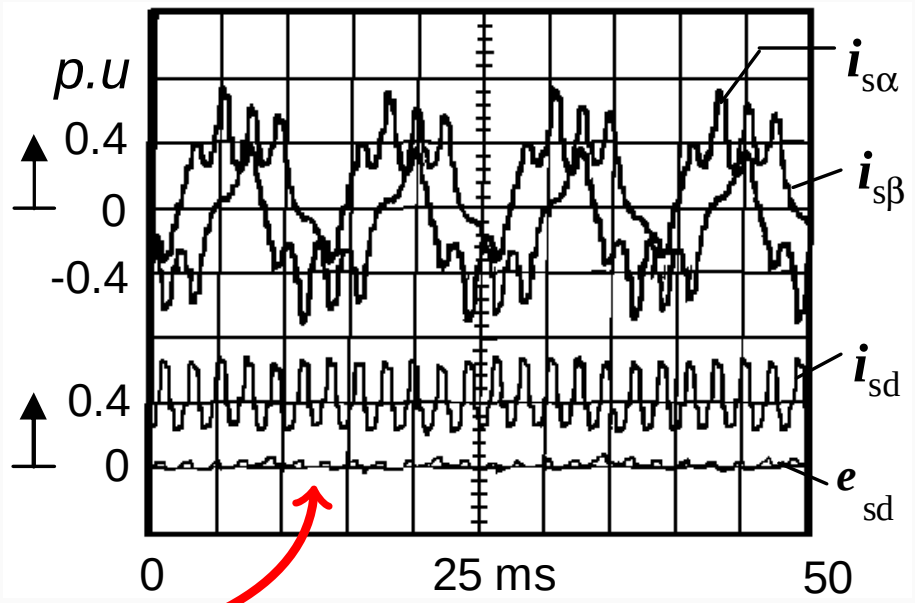



causes



# By cancelling the 6n harmonics - current controllers sees only DC



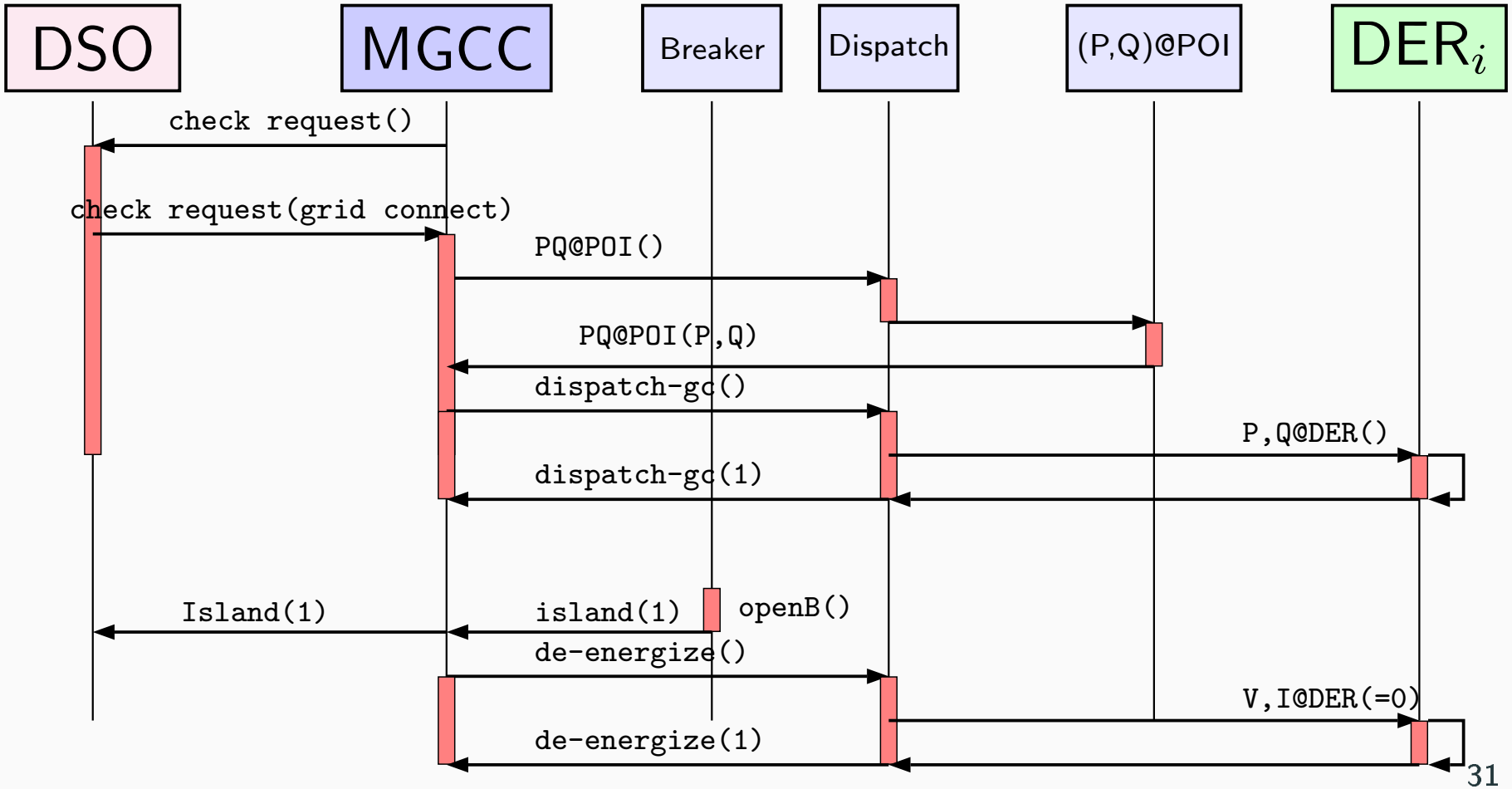




compensating

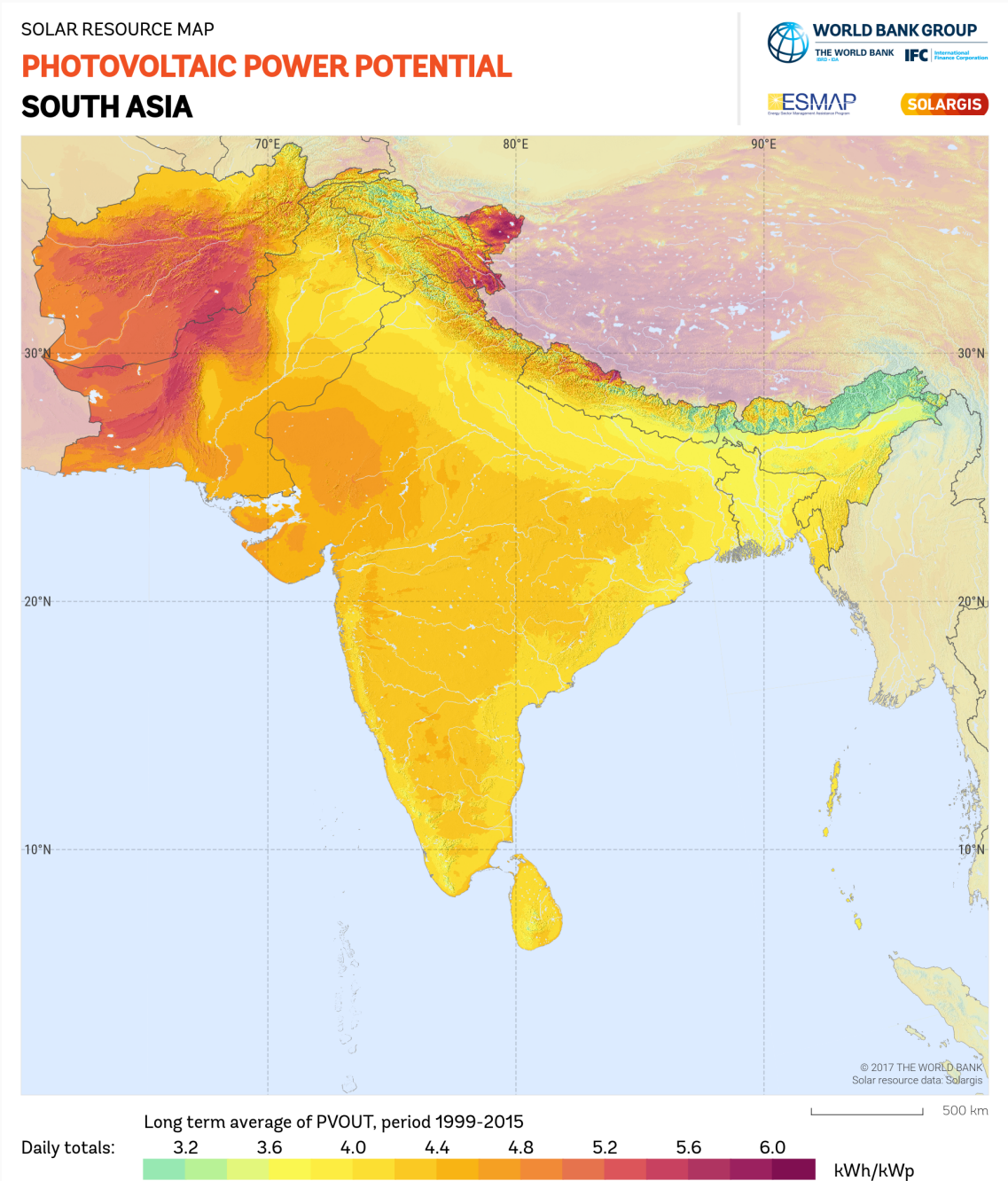
**With compensating current control**

# When unintentional islanding occurs, de-energize the micro-grid (When ? )

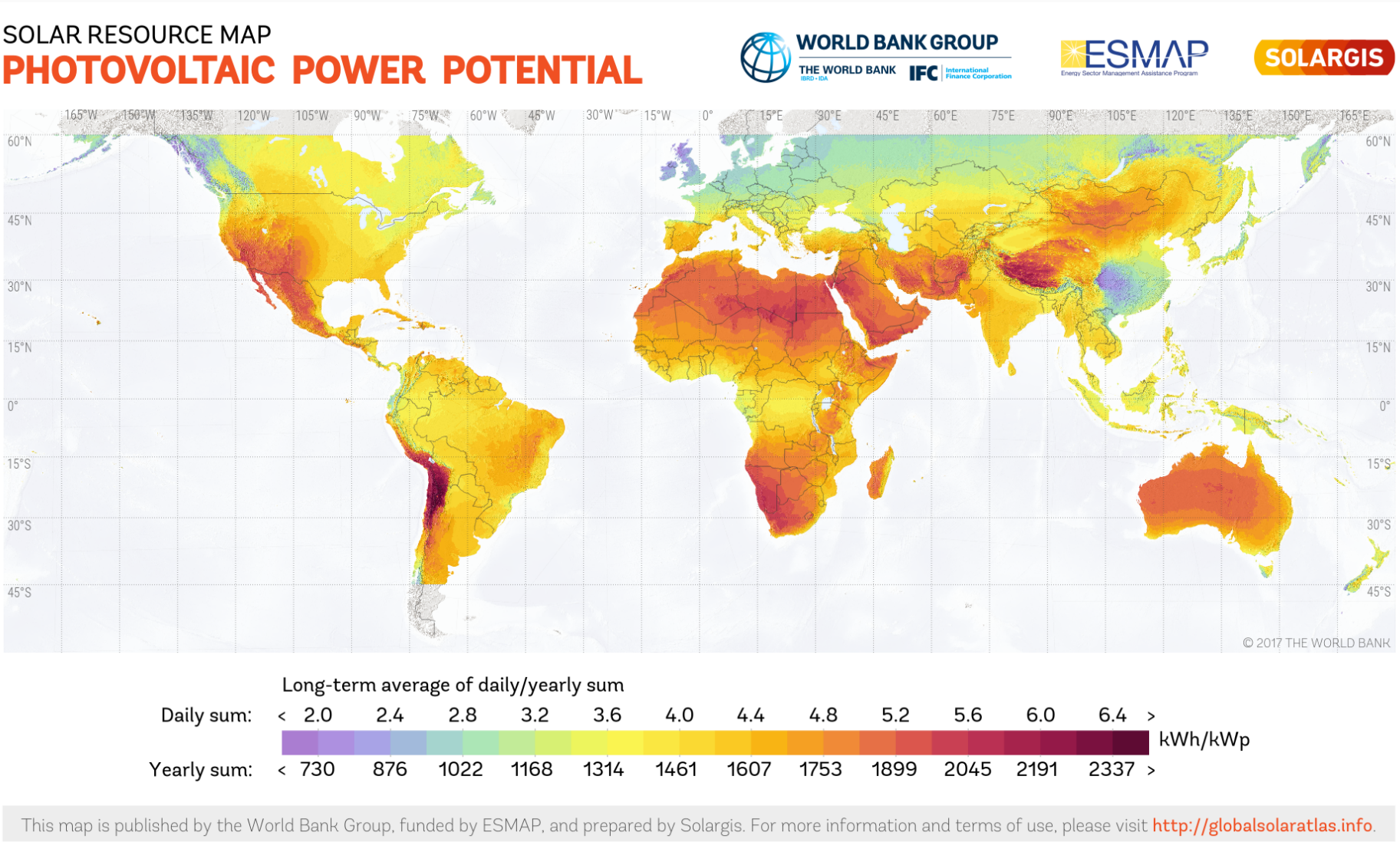
De-energization sequence **Example slide: When? Time sequence or cause and effect**



# India gets around 4-5 sun hours (How Much ?)

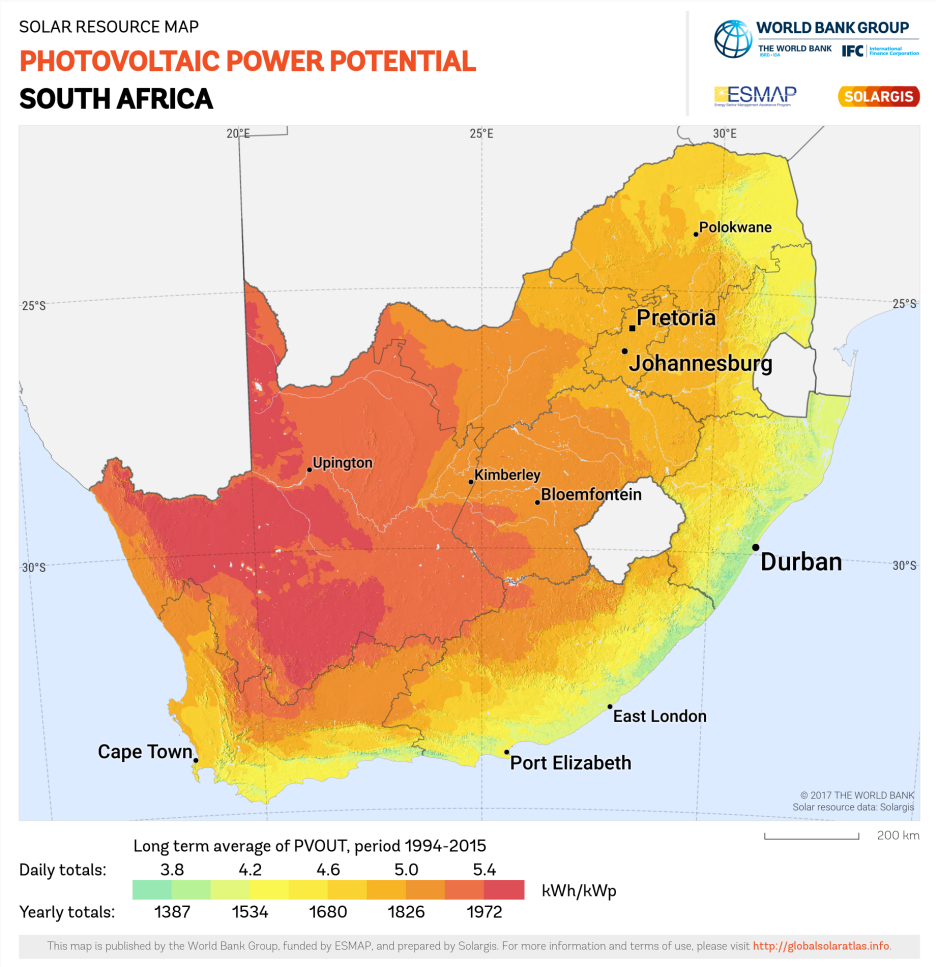


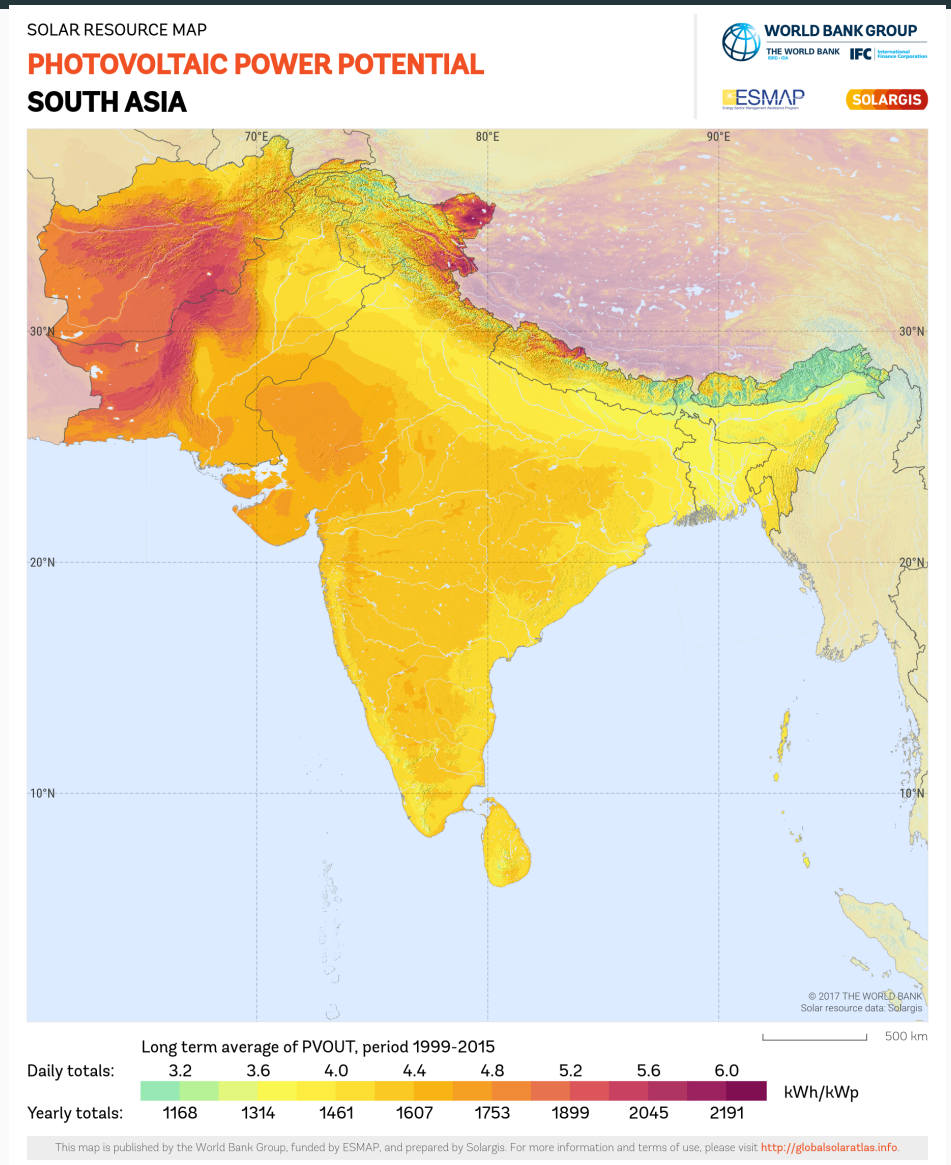
# India gets around 4-5 sun hours (How Much? Compare)



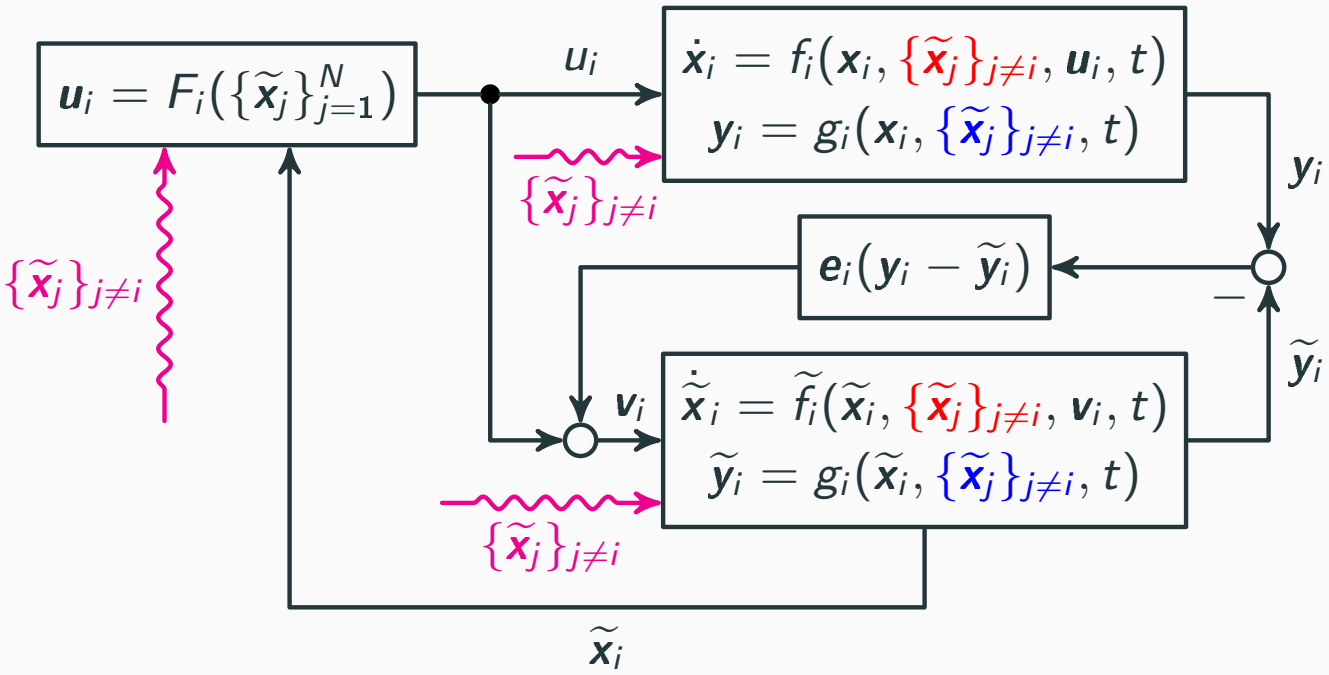

$$\text{Sun Hrs [h]} = \frac{\text{kWh}}{\text{kWp}}$$

# India gets around 4-5 sun hours (How Much ?compare with)



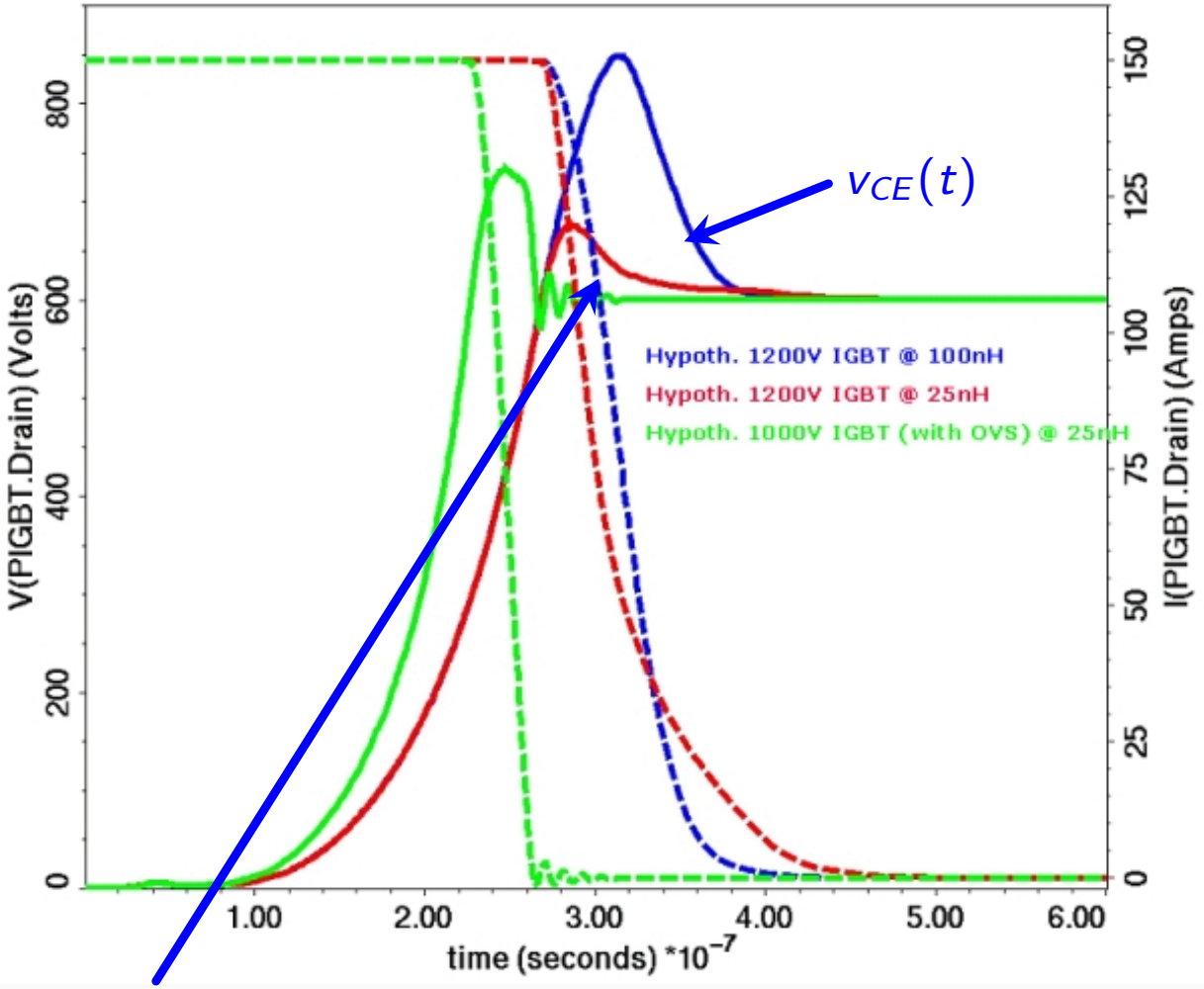
# Picture speaks thousand words? You should not need thousand words to explain it




- Equations in a conference talk may not help your audience - (keep back-up)
- If you really, really, really must.....Use equations judiciously
- You can't impress your audience with Equations

# Short Demo
# Parasitics in Power Electronics Design have major influence on performance

# High Overvoltage across IGBT during turn-off adds to losses




The Problem

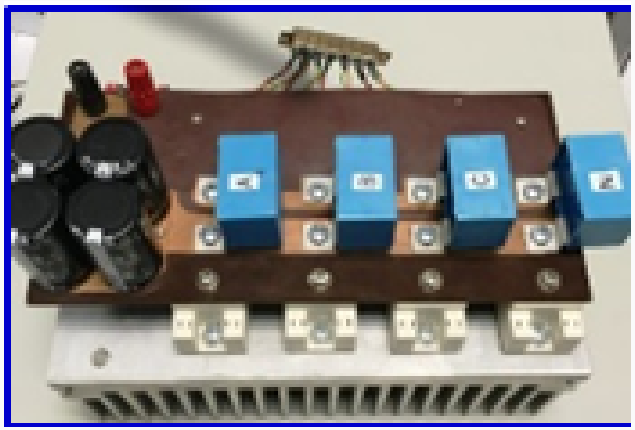
$$V_{CE} = V_{DC} - L_\sigma \frac{0 - I_o}{t_{fi}}$$

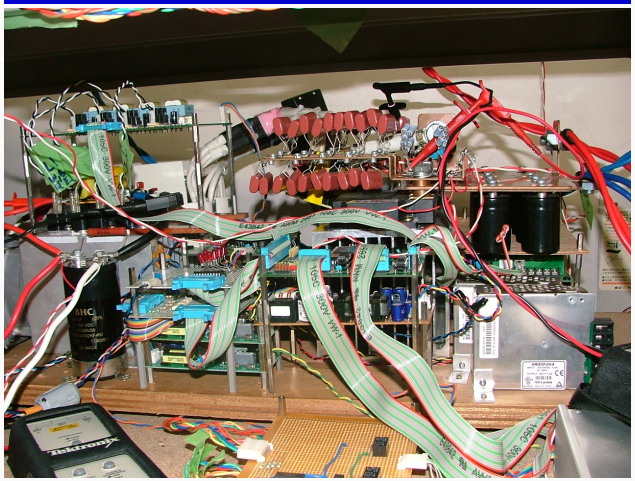
$$V_{CE} = V_{DC} + L_\sigma \frac{I_o}{t_{fi}}$$

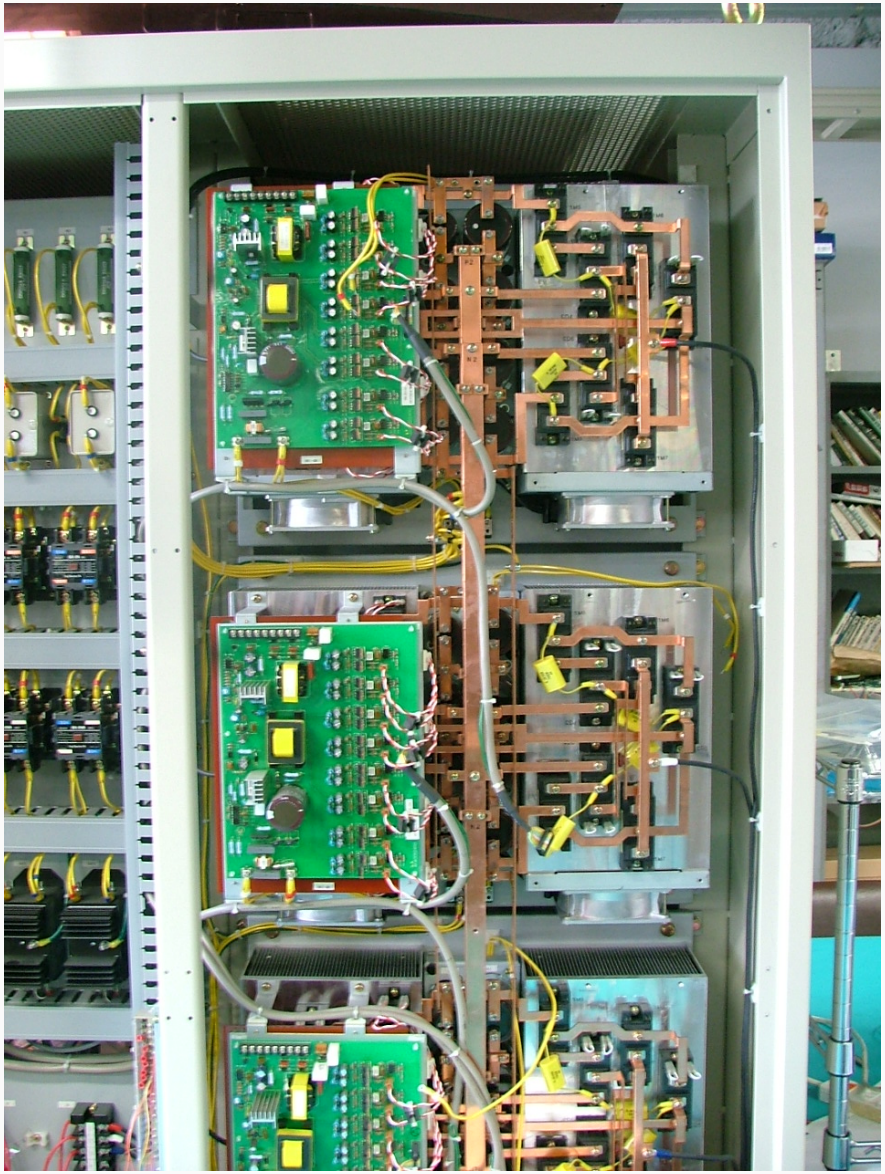
Higher the $L_\sigma$ - parasitic inductance, larger the Overvoltage

[5] http://www.edn.com/Home/PrintView?contentItemId=4371098

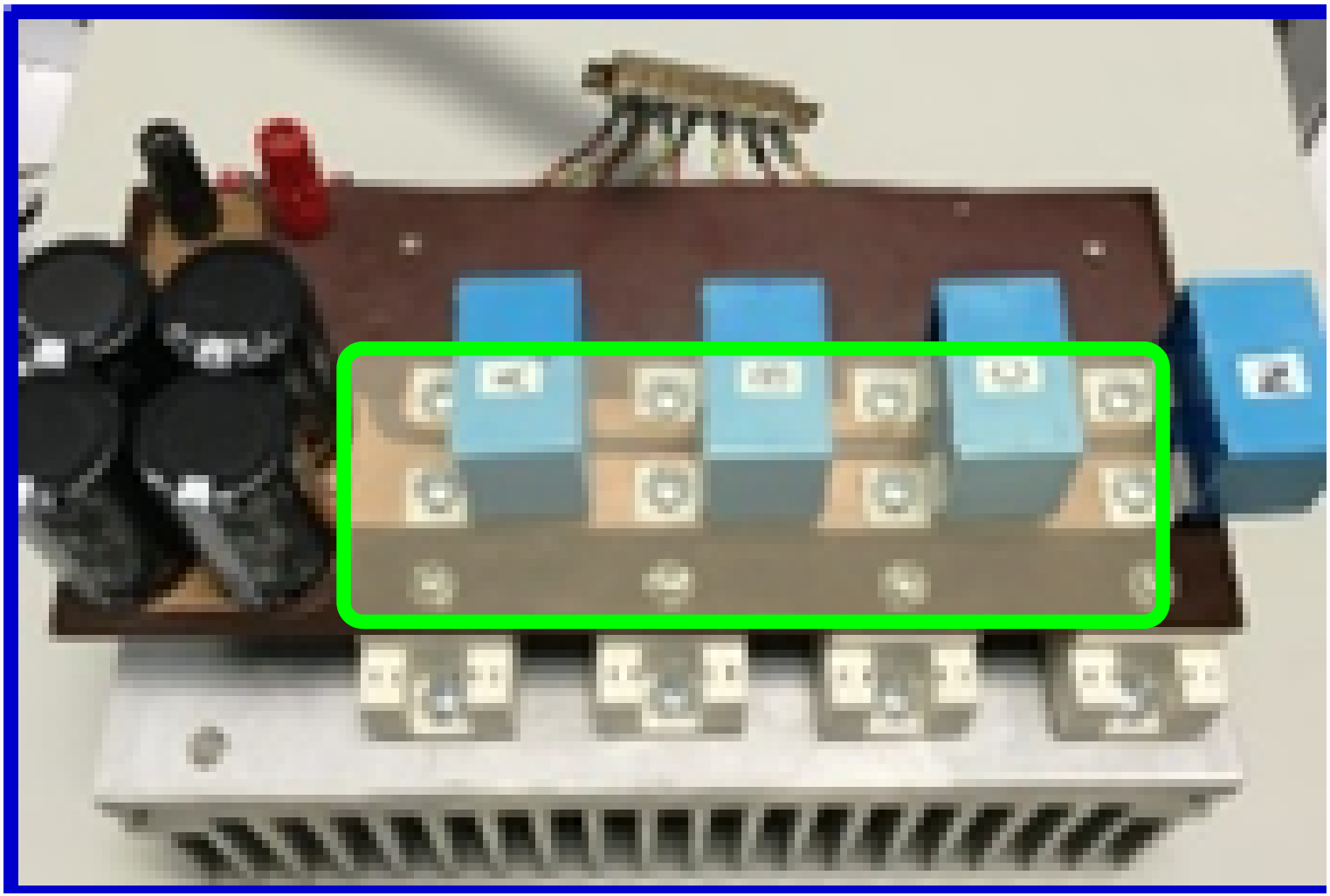
# Bad designs do not pay attention to parasitics (What ?)



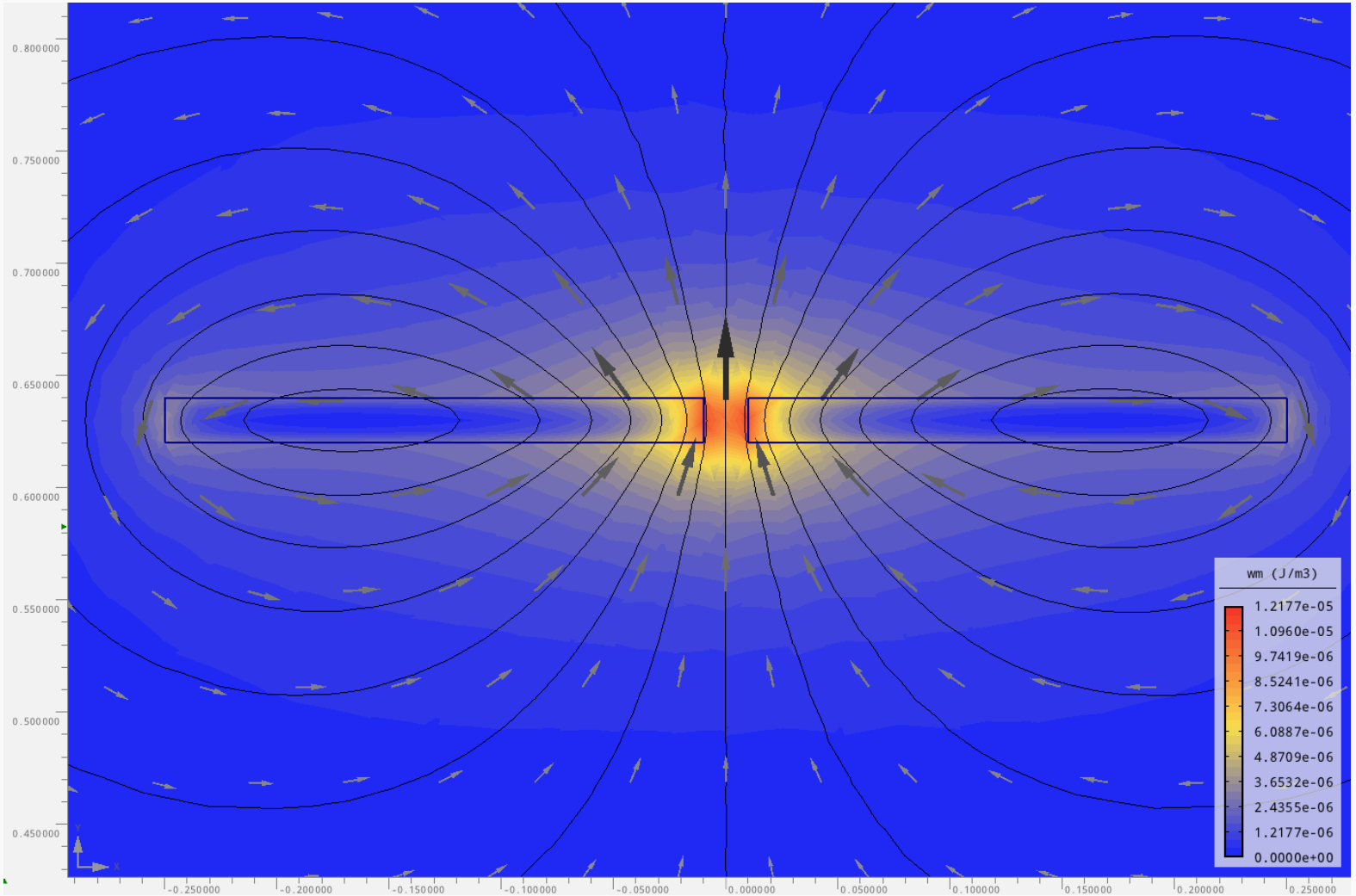




# Area enclosed by the current causes parasitic inductance (where?)



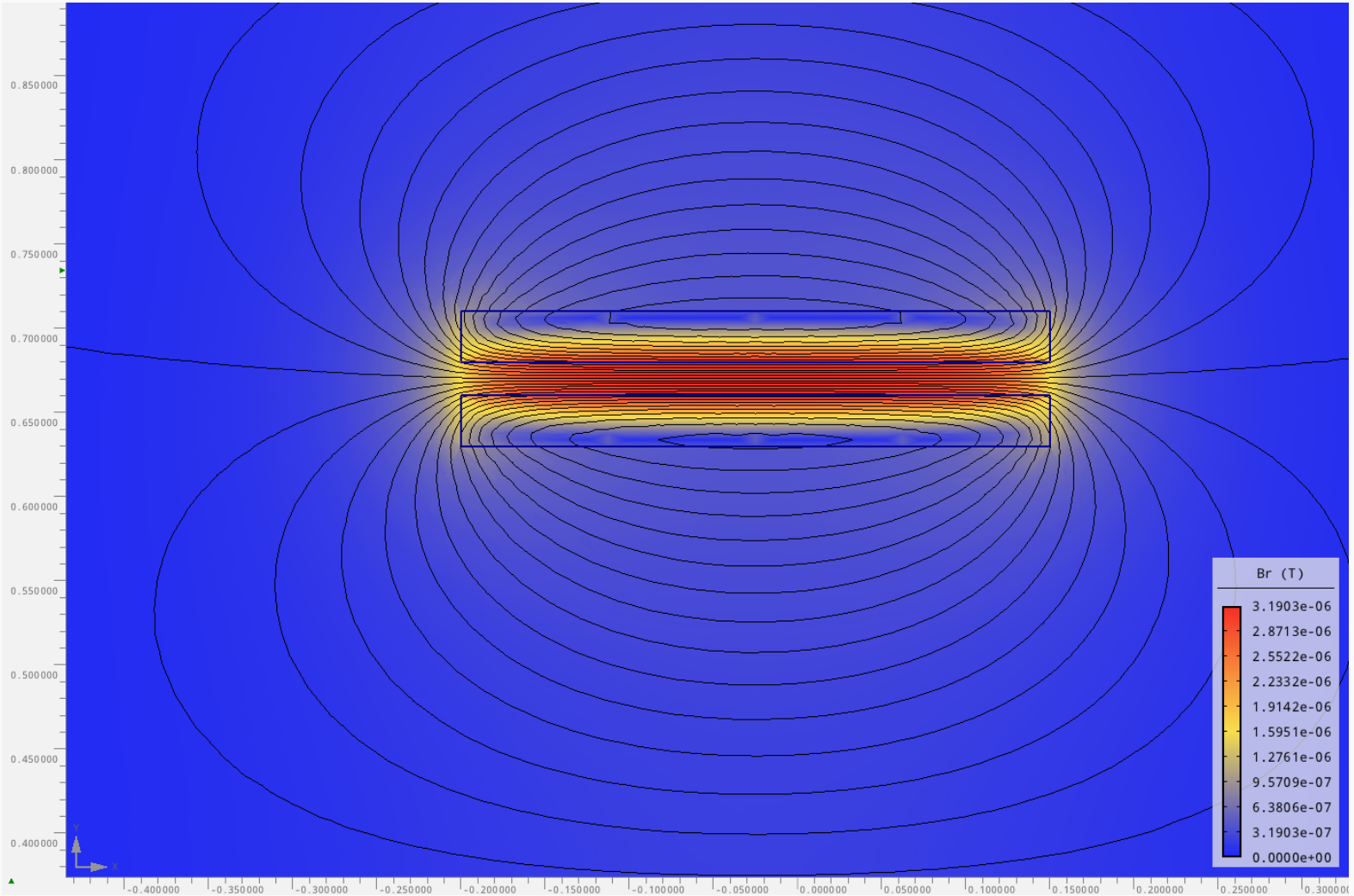
# Parasitic Inductance depends on the flux linkages: Parallel Busbar




Dimensions $d = 20\text{mm}$, $w = 200\text{mm}$, $t = 20\text{mm}$

Inductance $L = 239\text{nH/m}$

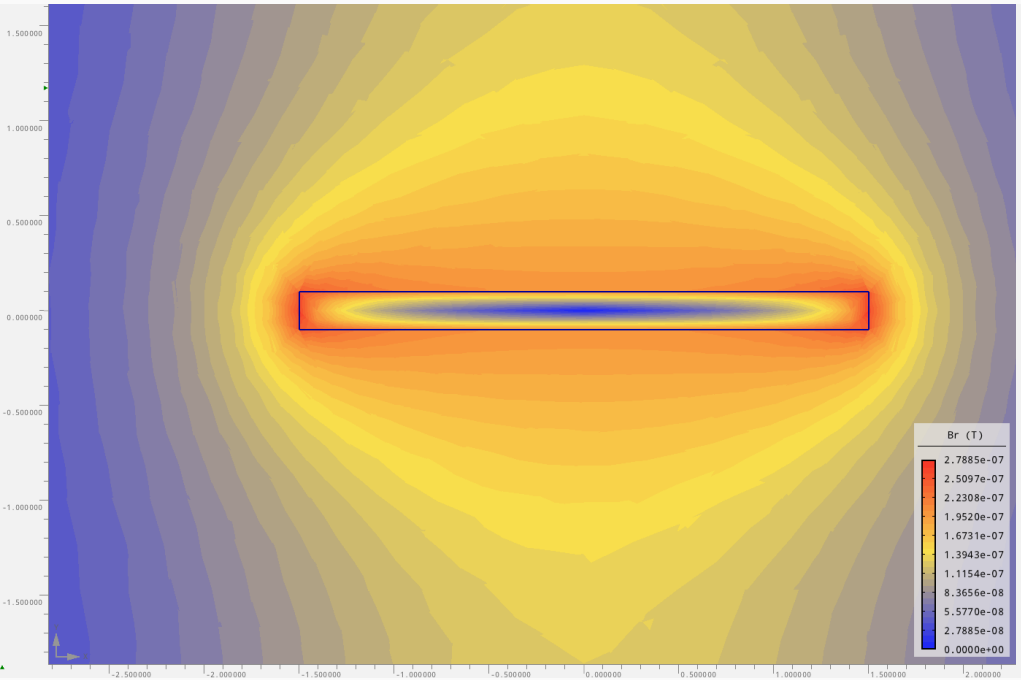
# Sandwiched Busbar 20mm apart: Field Plot

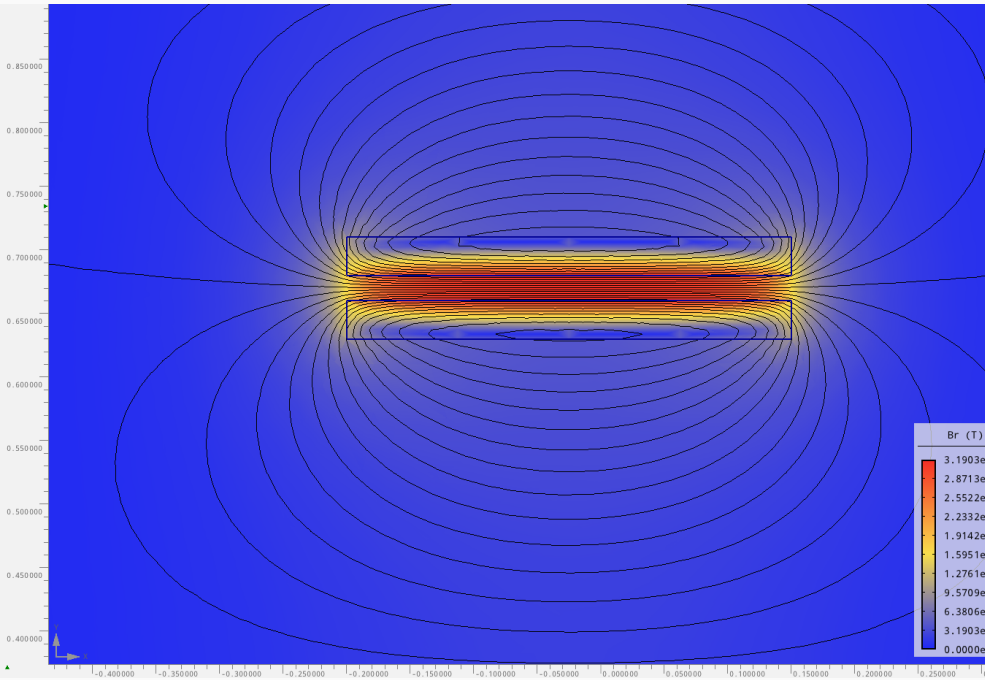



Dimensions $d = 20\text{mm}, w = 350\text{mm}, \ t = 30\text{mm}$

Inductance $L = 34.5\text{nH/m}$

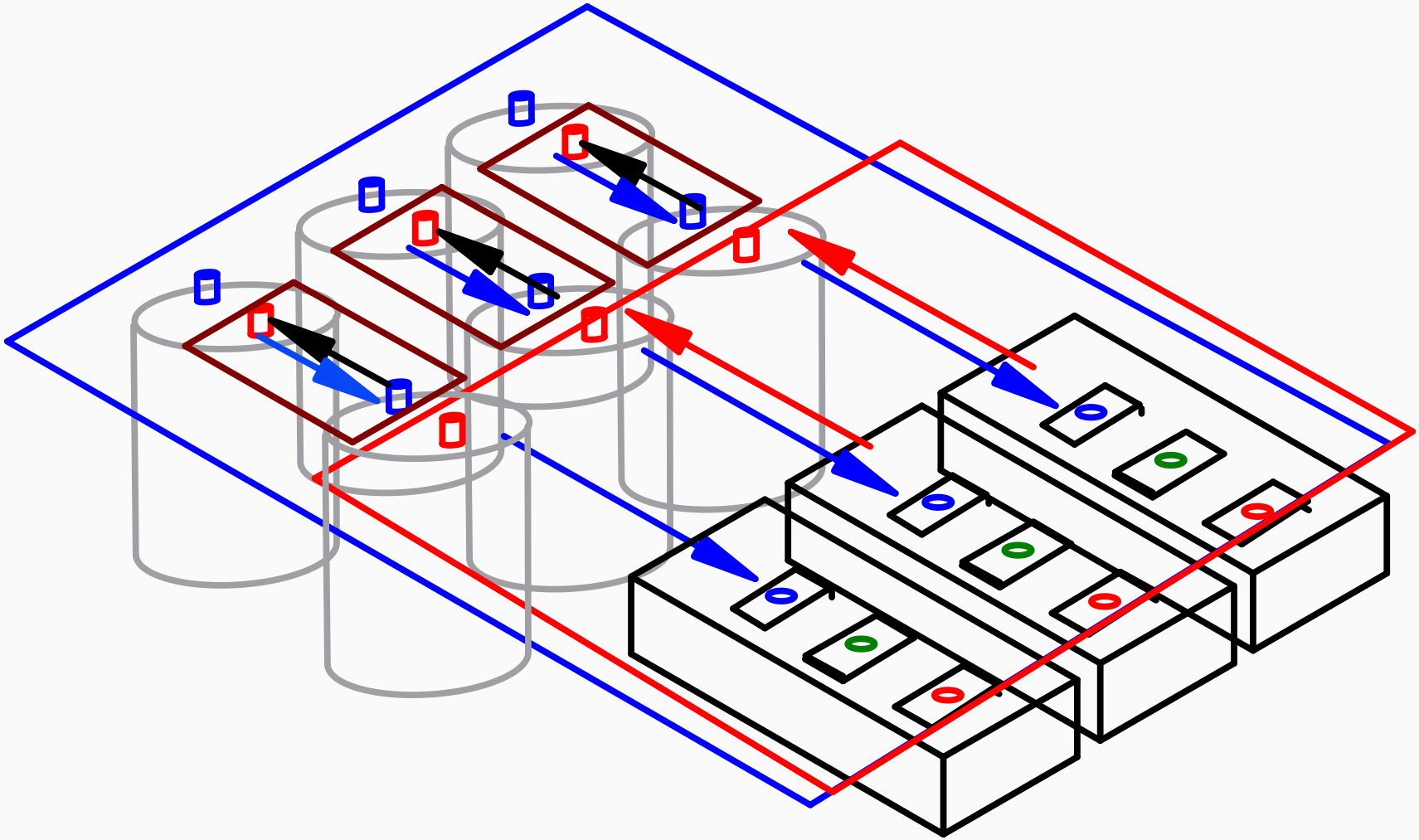
# Sandwiched bar limits flux to overlap volume



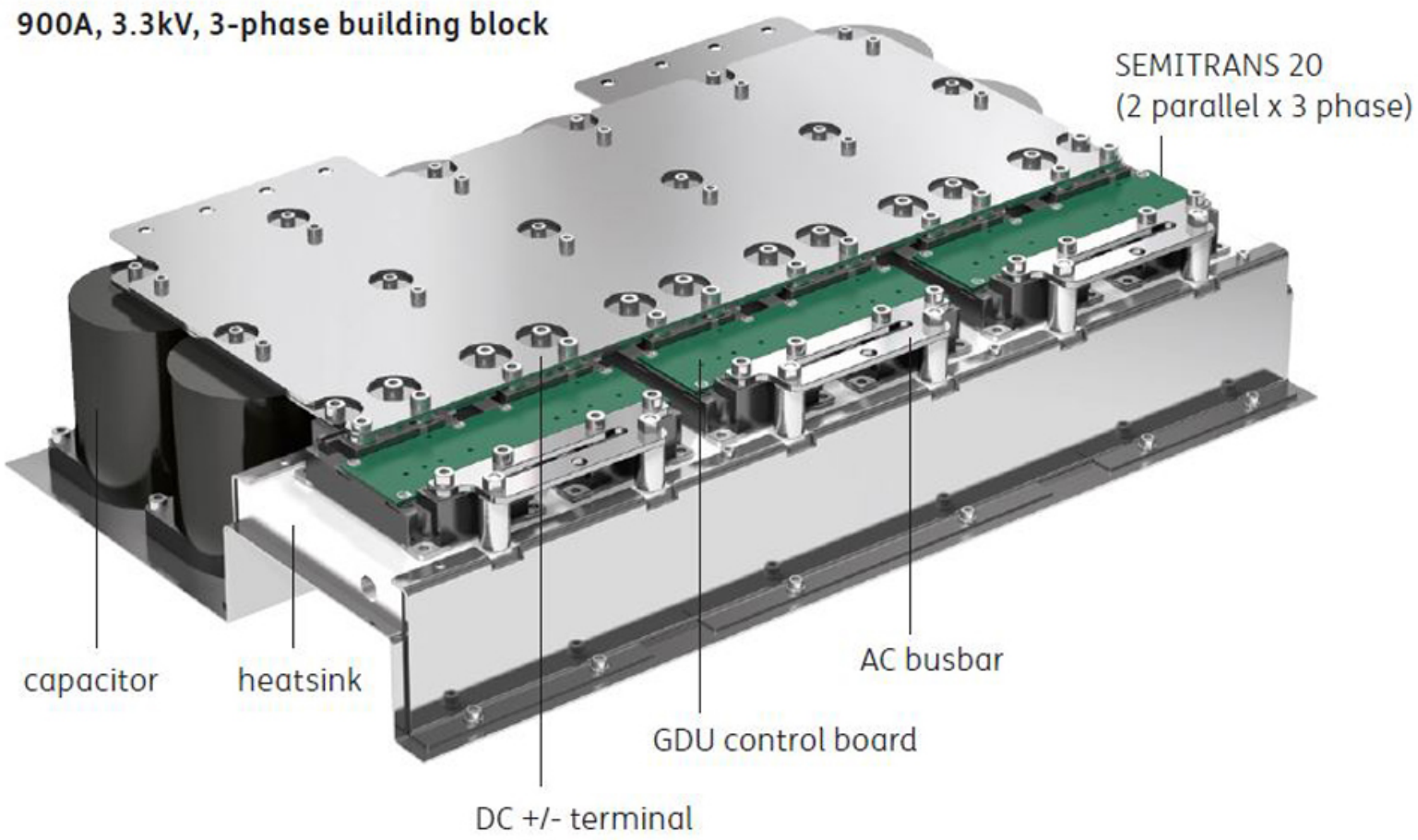




[5] using software Argos2D, https://www.agros2d.org/

# Good Designs follow fundamental principles



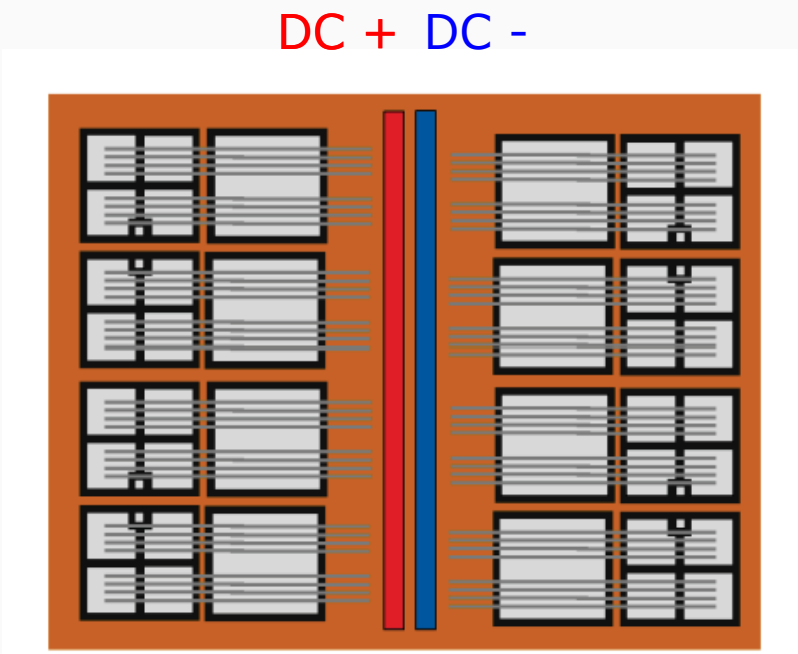
# Commercially available low inductance assemblies

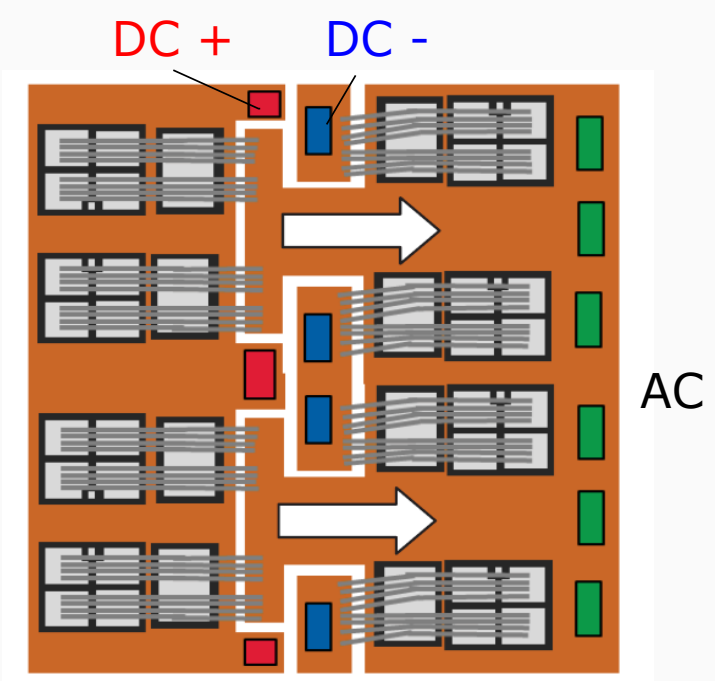


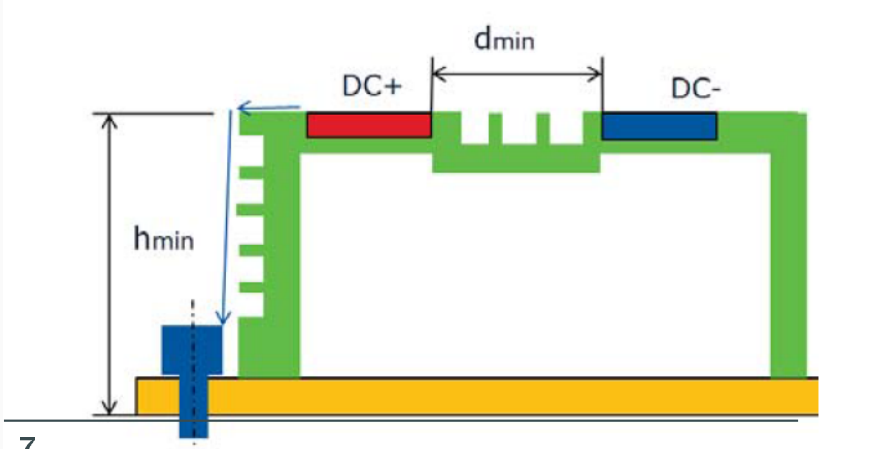

[6] www.semikron.com

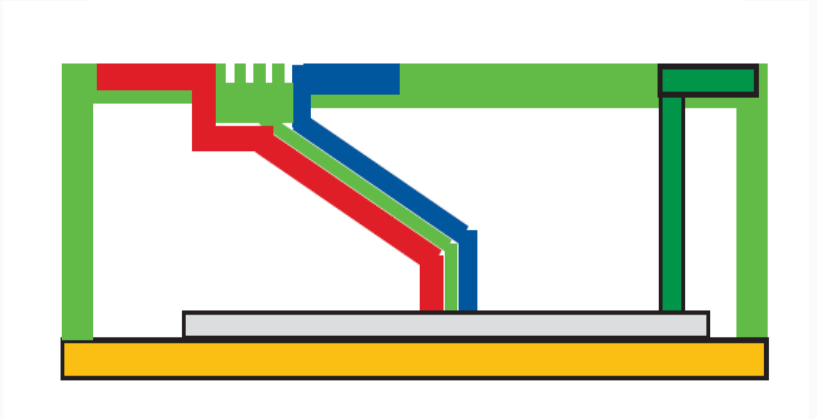
6

# It is also important to have low inductance design inside the device packing (approx 5 nH @ 700A)



7

7 Implementation of low inductive strip line concept for symmetric switching in a new high power module, Georg Borghoff, Infineon Technologies AG, Germany, PCIM Europe 2013, 14 – 16 May 2013, Nuremberg

# Tell your story with story boarding

# Appendix: On Style of Presentation

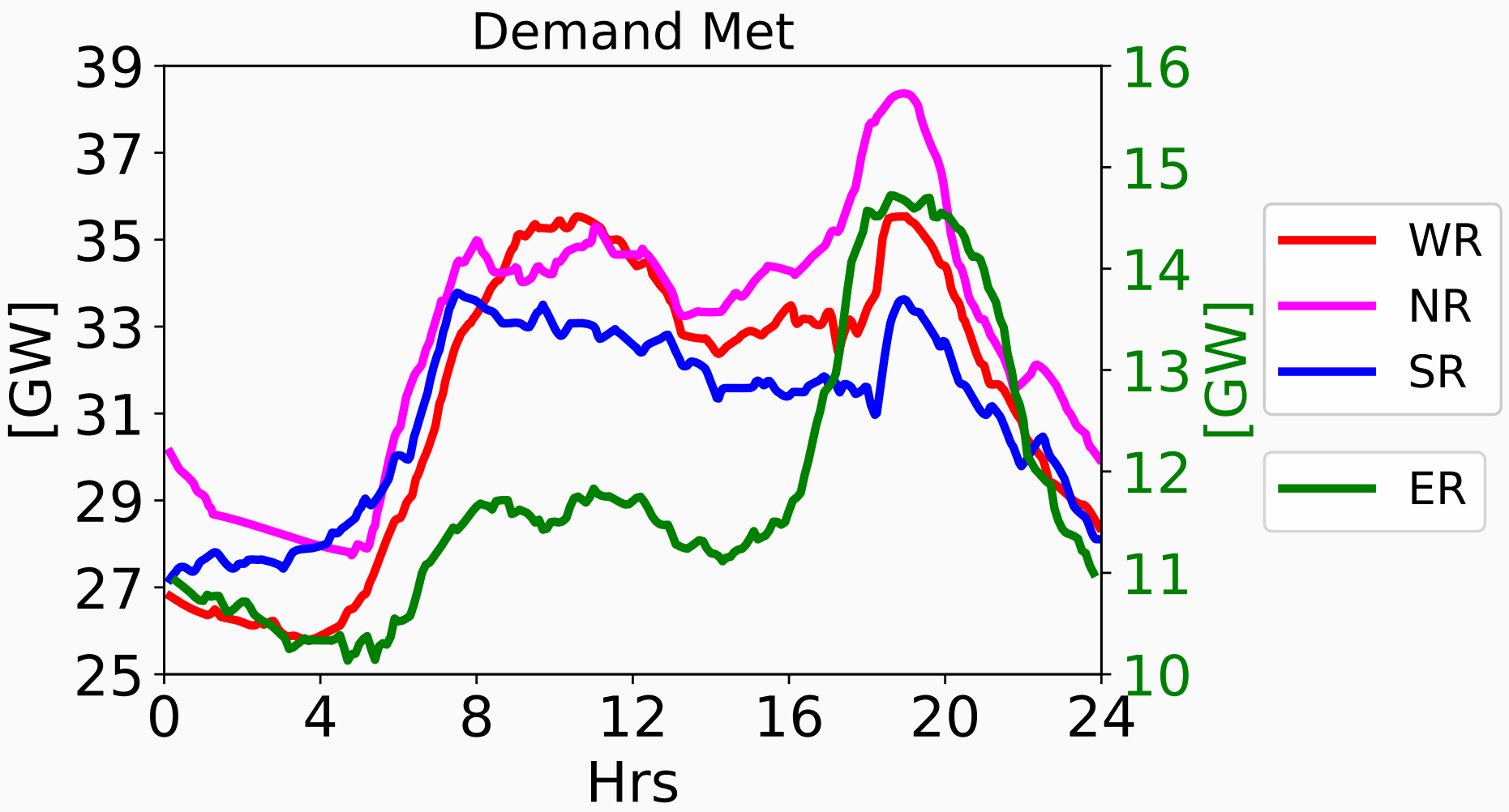
# Be judicious with use of color

**This is bad**
**Do not use serif fonts**
**and avoid color green**
Some colors that work

- **Burgundy**
- **Maroon**
- **Dark Green**

**This is good, use sans serif font family**
**Use minimum font size 18 on slide**

# Size the figure when you draw it

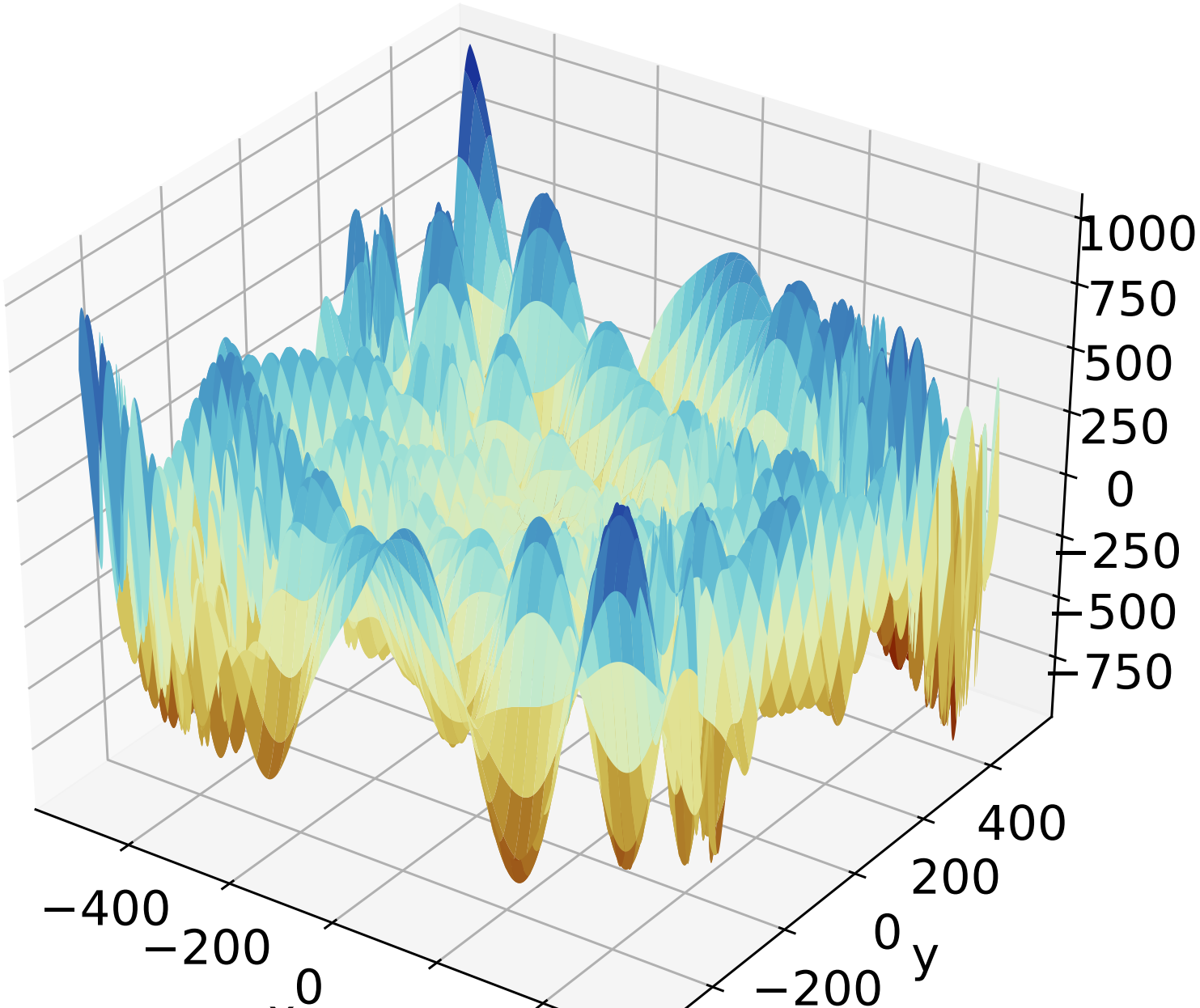



made with Matplotlib package in python, figure size 6 x 3.5 inches, fontsize = 20, linewidth = 3pt, legend font = 16pt

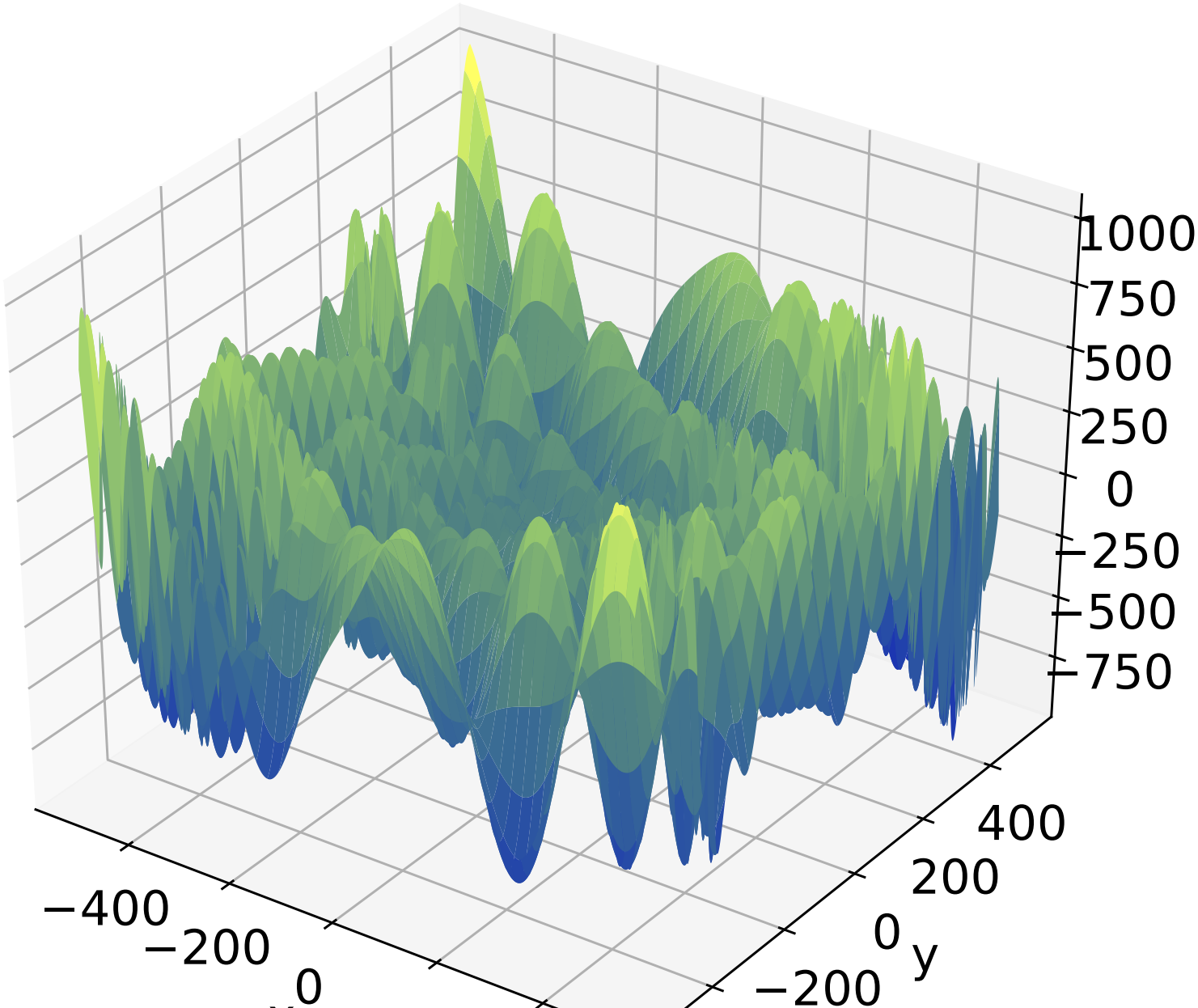
# Comparison Table: Shows How Much and compares

| Drive Train | Fuel | $E_{inICE}$ | $\eta_{pt}$ | FC | Range |
|---|---|---|---|---|---|
| | [kg] | [MWs] | % | [Wh/km] | [km] |
| ICE Petrol | 2.38 | 101.38 | 20.4 | 512 | 692 (40 L) |
| BEV | - | 28.82 | 84.6 | 146 | 485 (60 [kWh]) |
| Series HEV | 1.84 | 78.38 | 26.4 | 396 | 895 |
| Series/Parallel | 1.487 | 63.34 | 32.7 | 320 | 1108 |
| FCEV | 0.3666 | 44 | 47.1% | 222 | 750 (5kg) |

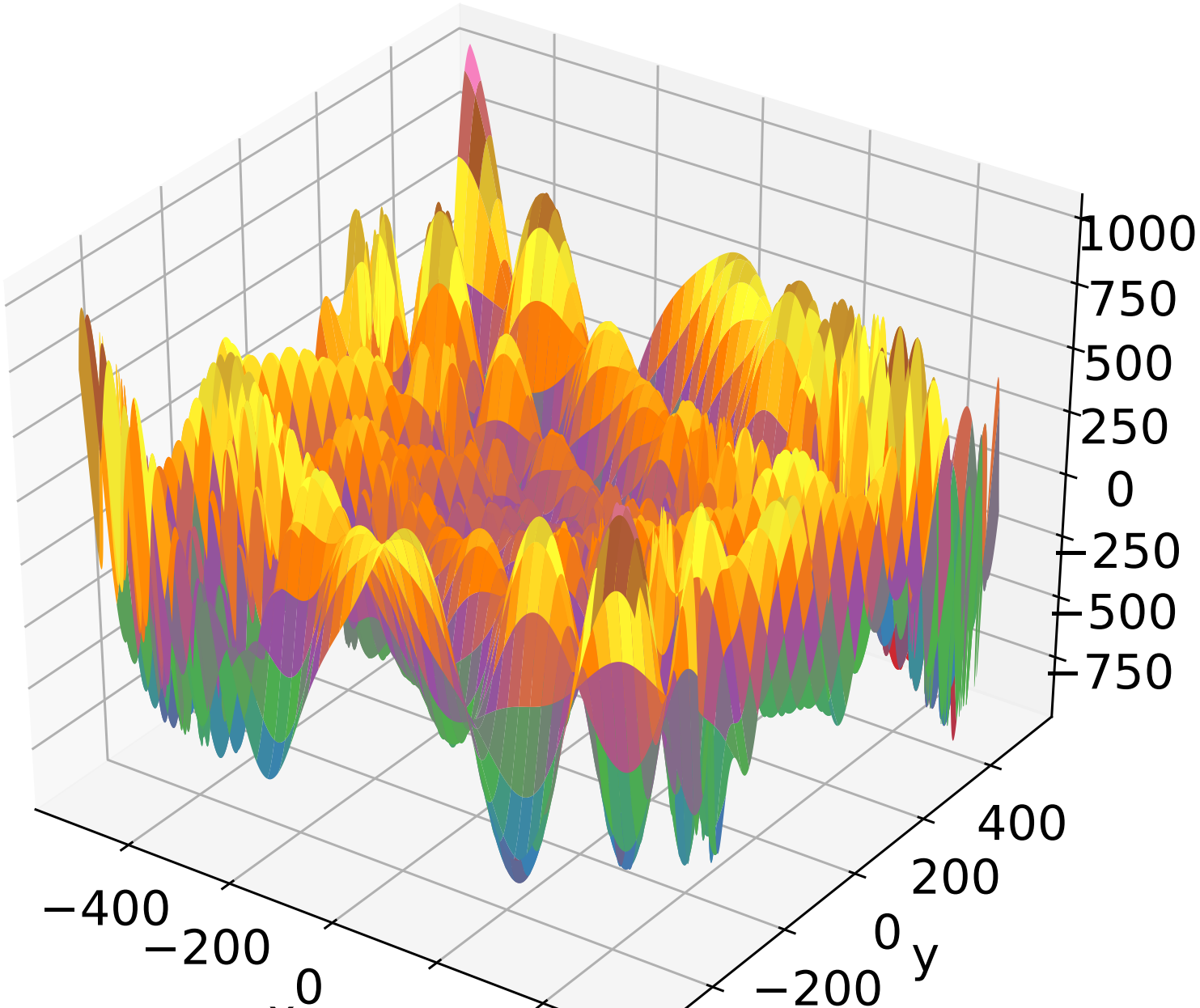
# Colormaps: Use Divergence to show variation



# Colormaps: Sequential not suitable for showing exteremes



# Colormaps: Qualitative can be used to see means



# Appendix: Equations or no Equations

# Animating math equation: Only if you must

- Coriolis acceleration

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

- Transversal acceleration
- Centripetal acceleration

8

[8] Source: http//www.texample.net/tikz/examples/beamer-arrows/

# Animating math equation: Only if you must

- Coriolis acceleration
- Transversal acceleration
- Centripetal acceleration

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

8

[8] Source: http//www.texample.net/tikz/examples/beamer-arrows/

# Animating math equation: Only if you must

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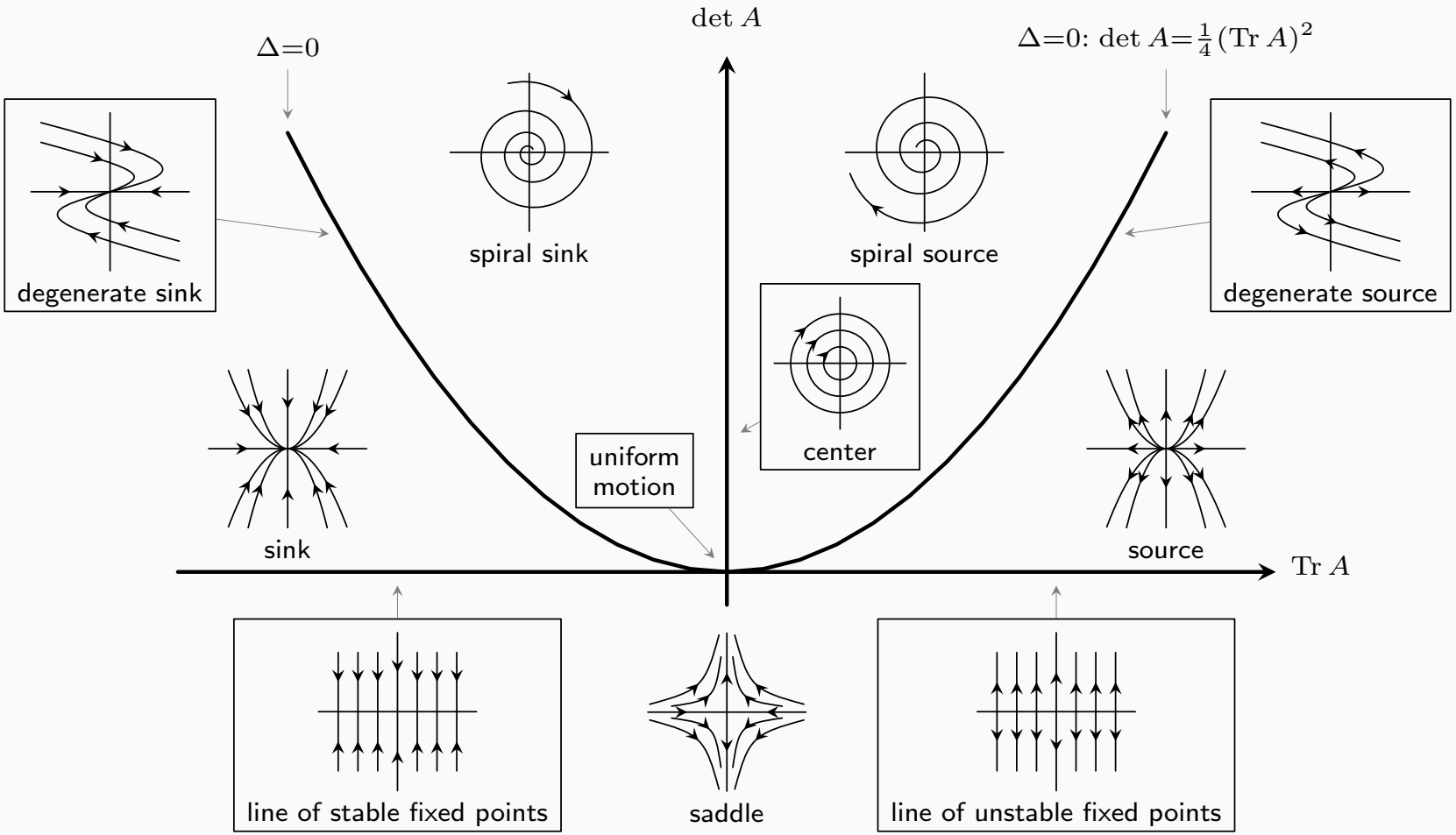
8

[8] Source: http//www.texample.net/tikz/examples/beamer-arrows/

# Planning your diagrams will make them effective

Poincaré Diagram: Classification of Phase Portraits in the $(\det A, \operatorname{Tr} A)$-plane




9

[9] Source:http://www.texample.net/tikz/examples/poincare/

# References

- Craft of Scientific Presentations
- A PhD is not Enough by Peter Feibelman, ISBN-10: 9780465022229, Basic Books; 2 edition (11 January 2011)
- The Back of the Napkin, by Don Roam, ISBN-10: 1591842697,Portfolio; Expanded edition (26 February 2013)
- Craft of Scientific Presentation Templates
- Craft of Scientific Presentation Model Talks
- Presentation Zen: Website of two contrasting Philosopies