

Lernerfolgskontrolle

Vor, während und nach der Vorlesung

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Michigan State University
z.Zt. Massachusetts Institute of Technology

Technologie-Einsatz in der universitären Lehre?

Muss in die Lernumgebung eingebunden sein!

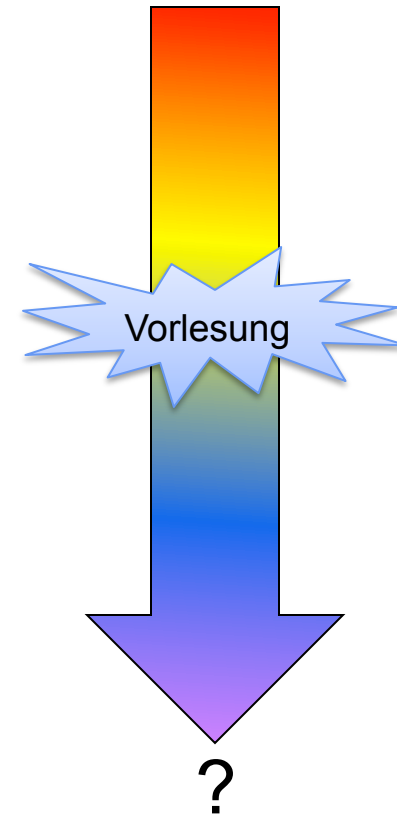
- Unterstützung der Lernziele
 - nicht Technologie um der Technologie willen
- Nicht vereinzelte Technologie-Höhepunkte
 - konsistenter Einsatz
 - Lernende müssen wissen, was sie zu erwarten haben, und was erwartet wird
- Technologie tritt in den Hintergrund
 - keine Show oder Spielerei
- Produktiv
 - Lernende interagieren mit den Materialien
 - Keine Zeitverschwendung für die Lernenden
- Effektives und zeitnahes Feedback an Lernende und Lehrende: **Lernerfolgskontrolle**

Assessment

- Feedback an Lehrende und Lernende
- Formatives Assessment:
 - Lernende können ihren Fortschritt verfolgen
 - Lernende bleiben nicht im Lernstoff zurück
 - Besonders in der Physik ein Problem, da Themen aufeinander aufbauen und Lücken unüberbrückbar werden können
 - Lehrende können den Fortschritt der Lernenden verfolgen
 - Können die Lehre dem Lernen anpassen
- Summatives Assessment:
 - Technologie erlaubt häufigere Klausuren

Überblick: Das Spektrum

- Vorlesungsvorbereitung
 - Online-Aufgaben vor der Vorlesung
 - Studierende kommen vorbereitet
 - Just-In-Time Teaching
- Während der Vorlesung
 - Clickers
- Vorlesungsnachbereitung
 - Hausübungen
 - Online-Diskussionen, “Helproom”
- Schließlich: Klausuren
- Hilft das überhaupt?
- Wie ist das realistisch möglich?
 - Kurs- und Lehrinhaltsverwaltung!
 - Nur in USA?




Vorlesungsvorbereitung

Studierende kommen vorbereitet
Just-In-Time Teaching

Online-Aufgaben vor der Vorlesung

Gerd Kortemeyer (No Role, Cumulative Privileges)

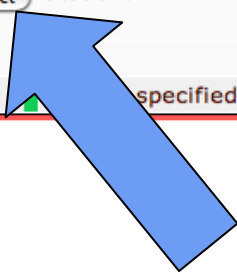
 Messages Roles Help Logout

Main Menu |

Menu » **User Roles**

Show all roles

| | User Role | Extent | Start | End |
|---------------------------------------|--------------------|--|------------------------------------|-----------------------------------|
| Construction Space | | | | |
| <input type="button" value="Select"/> | Author | Domain: nds Server: vita.sonia.de | Tue May 11 12:13:40 am 2010 (CEST) | |
| Course | | | | |
| <input type="button" value="Select"/> | Course Coordinator | Your Test Course Syllabus Domain:nds | | |
| <input type="button" value="Select"/> | Student | LB271, Fall 2008 - Intro Calculus-Based Physics I Syllabus Section: guest | Sun Aug 24 06:00:00 am 2008 (CEST) | Tue Dec 14 05:59:59 am 2010 (CET) |
| | | specified | | Currently selected. |



Online-Aufgaben vor der Vorlesung

- Einfache Fragen, eingebettet in die online Materialien
- Fällig vor der Vorlesung

| Time-Varying Currents Materials | | | |
|---------------------------------|------------------------------------|--|-------------------------|
| | Introduction | | |
| | RC Circuit | | |
| | RC Circuit Example | | |
| | Applet: RC Circuit with Battery | | |
| | RL Circuit with Battery | | |
| | RL Circuit with Battery Example | | |
| | LC Circuit | | |
| | LC Circuit with Battery Example | | |
| | LC Circuit Time Evolution | | |
| | LC Time Evolution Example | | |
| | DC RCL Circuit | | |
| | DC Circuit Basics | | Answer available |
| | Alternating Currents and Voltages | | |
| | Applet: Oscilloscope | | |
| | AC Power Dissipation in a Resistor | | |
| | AC Power Dissipation Example | | |
| | RMS Current, Voltage, and Power | | Answer available |
| | Inductance in an AC Circuit | | |
| | Inductance in AC Circuit Example | | |
| | RL-Circuits | | Answer available |
| | Capacitor in an AC Circuit | | |

Online-Aufgaben vor der Vorlesung

- Stellen sicher, dass die Studierenden die Materialien lesen
- Fragen können direkt basierend auf die Materialien beantwortet werden (niedriges Bloom-Level)
- Aufgaben leicht verschieden für verschiedene Studierende
 - Studierende können nicht einfach „abschreiben“
 - Mehr später
- Studierenden kommen vorbereitet

Which of the following statements are true?

False: In a circuit consisting of an AC voltage source and a resistor, the dissipated power is proportional to the current.

True: In a circuit consisting of an AC voltage source and a resistor, the voltage drop across the resistor and the voltage source are in phase.

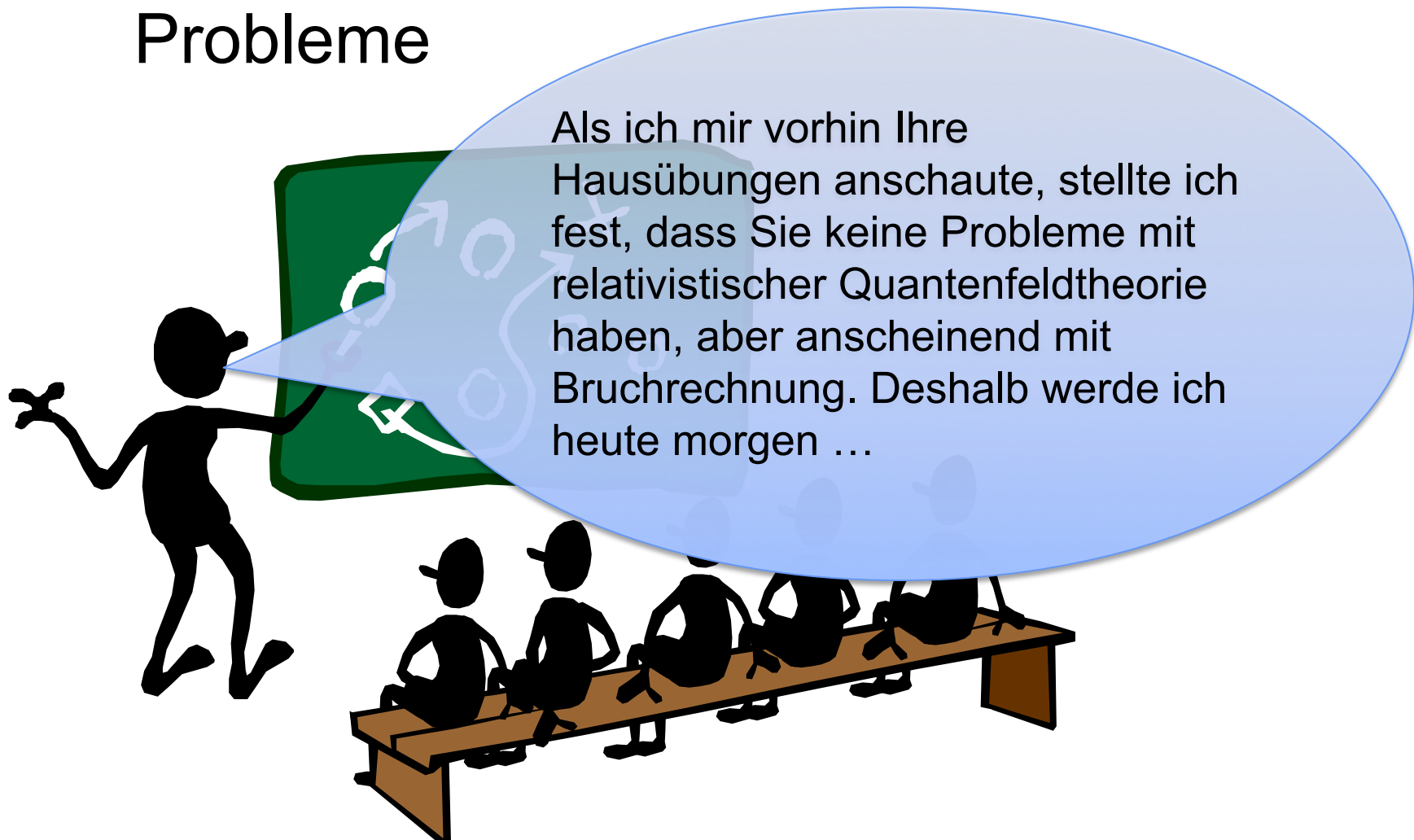
True: The rms-voltage is proportional to the maximum AC-voltage.

True: In a circuit with a capacitor and inductance in series (no resistance), if the capacitor is initially charged, an un-damped harmonic oscillation takes place.

Computer's answer now shown above. Tries 0/6

Just-In-Time

- Anpassung der Vorlesung an tatsächliche Probleme



Just-In-Time

Course Action Items

Gerd Kortemeyer
Course Coordinator
LBS 272 - Spring 2006

LBS 272 - Spring 2006 > Display Action Items

What's New?

[Go to first resource](#)

Page set to be displayed after you have

Diskussionen

What's New? page (user preference) **Change** for just [this course](#) or for all your courses.

[Hide all](#) [Show all](#)

Problems requiring handgrading [Hide](#)

| Problem Name | Number ungraded |
|--------------------------------|-----------------|
| Electric Field | 4 |

Schwere Probleme

Problems with av. attempts ≥ 3 or deg. difficulty ≥ 0.8 and total number of students with submissions ≥ 4 [Hide](#)

| Resource | Part Num. | Num. students | Av. Attempts | Deg. Diff | Last Reset | Reset Count? |
|-----------------------------|-------------|---------------|--------------|-----------|------------|--------------------------|
| Field Lines | single part | 24 | 2.12 | 0.84 | | <input type="checkbox"/> |
| Net Force | single part | 53 | 2.49 | 0.80 | | <input type="checkbox"/> |
| Pith Balls | single part | 52 | 4.12 | 0.90 | | <input type="checkbox"/> |

[Reset counters to 0](#)

Problems with av. attempts ≥ 3 or deg. difficulty ≥ 0.8 and total number of students with submissions ≥ 4 [Hide](#)

| Resource | Part Num. | Num. students | Av. Attempts | Deg. Diff | Last Reset | Reset Count? |
|-----------------------------|-------------|---------------|--------------|-----------|------------|--------------------------|
| Field Lines | single part | 24 | 2.12 | 0.84 | | <input type="checkbox"/> |
| Net Force | single part | 53 | 2.49 | 0.80 | | <input type="checkbox"/> |
| Pith Balls | single part | 52 | 4.12 | 0.90 | | <input type="checkbox"/> |

[Reset counters to 0](#)

Resources in course with version changes since last week [Hide](#)

| Resource | Last revised | New version | Version used |
|---|--------------------------------|-------------|--------------|
| Applet: Electron Orbit | Fri Jan 13 10:18:52 2006 (EST) | 10 | 10 |
| Capacitance of a Sphere | Mon Jan 16 12:03:13 2006 | 8 | 8 |

Unread course discussion posts [Hide](#)

| Location | Type | Time of last post | Number of new posts |
|---------------------------------|----------|---|---------------------|
| Coulomb | Resource | last Monday, Jan 16 at 04:55 pm (EST) | 1 |
| Distance Change | Resource | last Monday, Jan 16 at 07:00 pm (EST) | 1 |
| Field Lines | Resource | last Monday, Jan 16 at 07:49 pm (EST) | 1 |
| Force | Resource | on Wednesday, Jan 11 at 07:01 pm (EST) | 3 |
| Net Force | Resource | 23 hours, 19 minutes ago | 5 |
| Pith Balls | Resource | last Monday, Jan 16 at 09:21 pm (EST) | 6 |
| Point P | Resource | last Friday, Jan 13 at 02:34 pm (EST) | 5 |
| Potential | Resource | last Sunday, Jan 15 at 03:15 pm (EST) | 1 |
| Two Charges | Resource | last Sunday, Jan 15 at 03:26 pm (EST) | 1 |
| Vector | Resource | last Saturday, Jan 14 at 01:32 am (EST) | 1 |
| Vectors | Resource | last Saturday, Jan 14 at 12:09 pm (EST) | 2 |

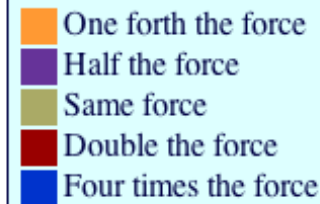
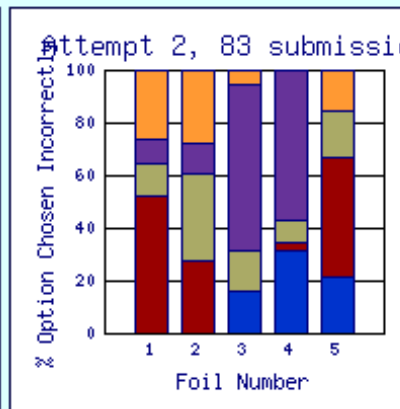
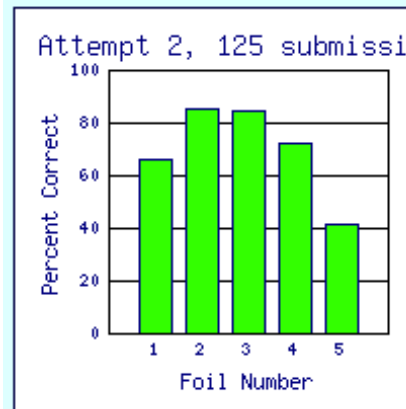
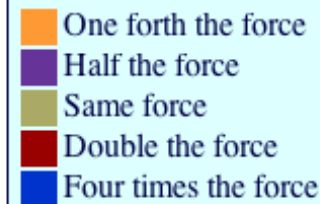
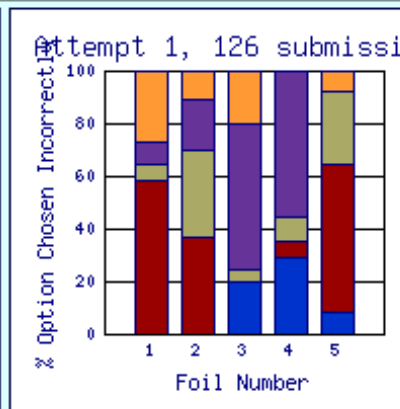
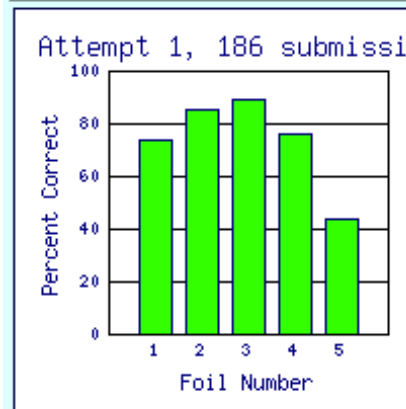
New course messages [Hide](#)

| Number | Subject | Sender | Date/Time |
|--------|--------------------------|--------|--------------------------------|
| 1. | Feedback | @msu | Sat Jan 14 10:45:02 2006 (EST) |

Unterstützung vor der Vorlesung durch Kursmanagementstatistiken

Just-In-Time

| Foil Number | Foil Name | Foil Text | Correct Value |
|-------------|-----------|---|----------------------|
| 1 | 1_6_1_1_2 | The distance between the two charges is cut in half. | Four times the force |
| 2 | 1_6_1_2_2 | The magnitude of both charges is doubled. | Four times the force |
| 3 | 1_6_1_3_2 | The magnitude of one of the two charges is doubled. | Double the force |
| 4 | 1_6_1_4_2 | The distance between the charges is doubled. | One fourth the force |
| 5 | 1_6_1_5_2 | The charges are placed in a medium with a factor two higher permittivity. | Half the force |



Während der Vorlesung

Clicker

Clicker

Versteht er nicht,
dass wir das
nicht verstehen?

Alles klar ...
nee, Moment
mal!

Gäh!

Was es
wohl in
der Mensa
gibt?

Alle anderen
kapiern das
vielleicht ...
ich nicht.

Leider nur zu oft:
Anonyme Gruppe von
Studierenden. Was geht
in ihren Köpfen vor?

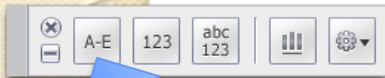


Clicker

- Radiofrequenz-Sender
- Einer pro Studierender
- Studierende können während der Vorlesung Antworten einreichen



Clicker



Capacitance and Dielectrics

So ...



Before



After

$$C = Q/V$$

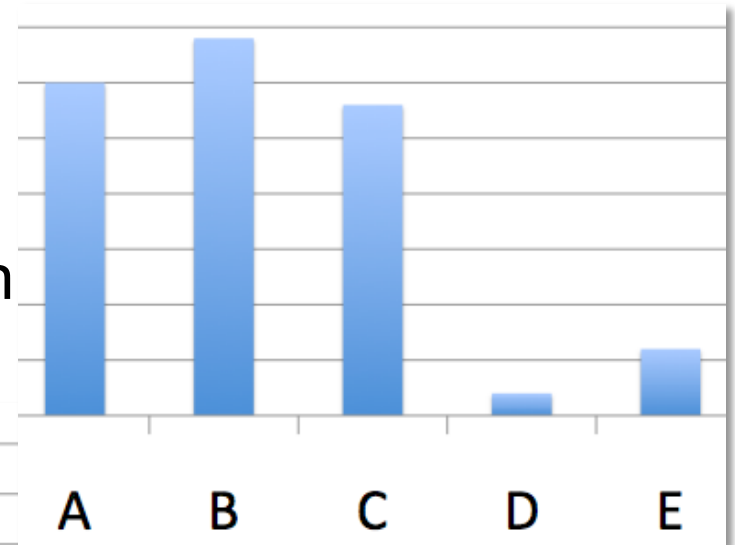
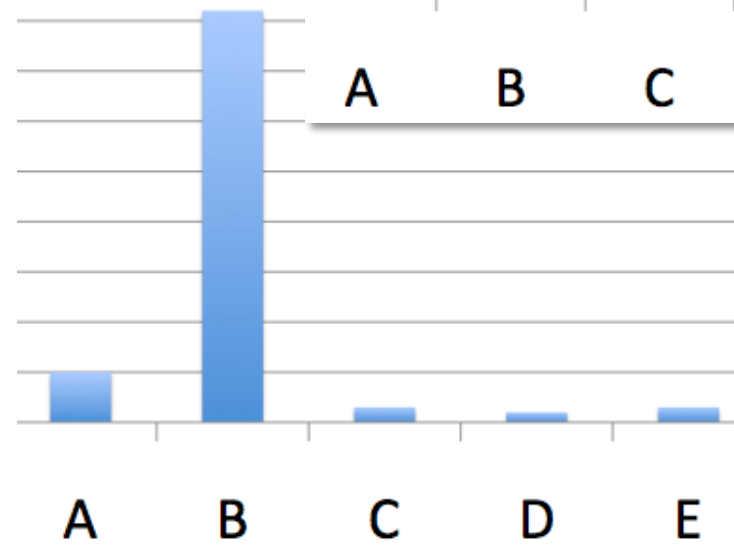
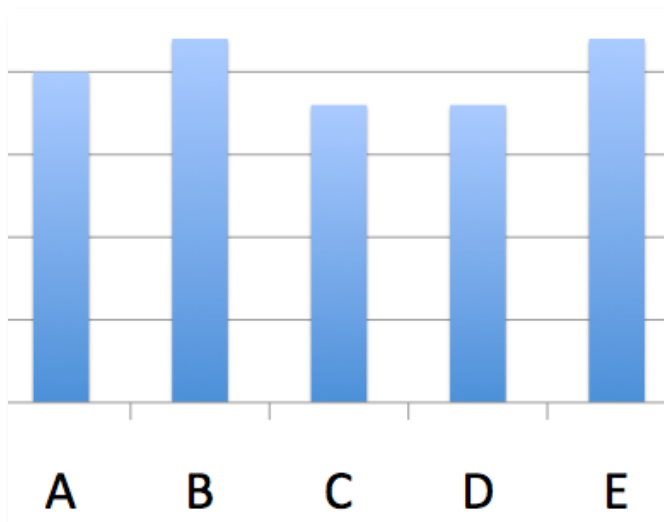
Voltage between the plates

- a) increases
- b) decreases
- c) stays the same

Clicker

Fortgang der Vorlesung hängt von Ergebnissen ab

- Noch einmal erklären
- Weitermachen
- Studierende diskutieren und noch einmal abstimmen lassen



Clicker

„Peer-Instruction“

- Studierende können einander Konzepte manchmal besser erklären als wir
 - Persönlicher Kontakt
 - Wir haben häufig vergessen, wo die anfänglichen Probleme sind
- Studierende lernen beim Erklären
 - “Von dem Thema verstehe ich nichts, ich muss erst eine Vorlesung darüber geben”

Clicker

- Studierende registrieren Clicker in LON-CAPA

LON-CAPA Change Preferences

http://phy1.lbs.msu.edu/adm/p

Getting Started Latest Headlines

LON-CAPA Course Statistics an... LON-CAPA Change Preferences

Main Menu Launch Remote Control Roles Help Exit

Change Preferences Gerd The Kortemeyer
No Role, Cumulative Privileges

Menu->Set User Preferences->Register Clicker Change Preferences


Enter response device ("clicker") numbers

005BC59E

Register

Clicker

- Punkte für korrekte und inkorrekte Antworten


 [Main Menu](#) [Return to Last Location](#) [Navigate Contents](#)

Grading (msu_8p96131ebae7b47b8msul1 ss08lbs272)

Current Resource: Mon, Mar 10th

Part: 0 score Type: numerical

Specify a file containing the clicker information for this resource.

 MonMar10thA.csv

Type:

Award points just for participation

Correctness determined from response by course personnel

Correctness determined from response with clicker ID(s)

Percentage points for correct solution:

Percentage points for incorrect solution:

Clicker

- Eingebunden in Kurs, zusammen mit Vorlesungsfolien

| | | | |
|---|--|---|-------------------|
| ▶ | Homework | | |
| ▶ | Recitation Grades | | |
| ▼ | Clicker Slides and Grades | | |
| ✖ | Mathematical Pre-Course, Part 1 | | |
| ? | Mathematical Pre-Course, Part 1 | → | Open, no due date |
| ✖ | Mathematical Pre-Course, Part 2 | | |
| ? | Mathematical Pre-Course, Part 2 | → | Open, no due date |
| ✖ | Units and Dimensions, Part 1 | | |
| ? | Units and Dimensions, Part 1 | → | Open, no due date |
| ✖ | Units and Dimensions, Part 2, and Kinematics, Part 1 | | |
| ? | Units and Dimensions, Part 2, and Kinematics, Part 1 | → | Open, no due date |
| ✖ | Kinematics, Part 2 | | |
| ? | Kinematics, Part 2 | → | Open, no due date |
| ✖ | Kinematics, Part 3 | | |

Vorlesungsnachbereitung

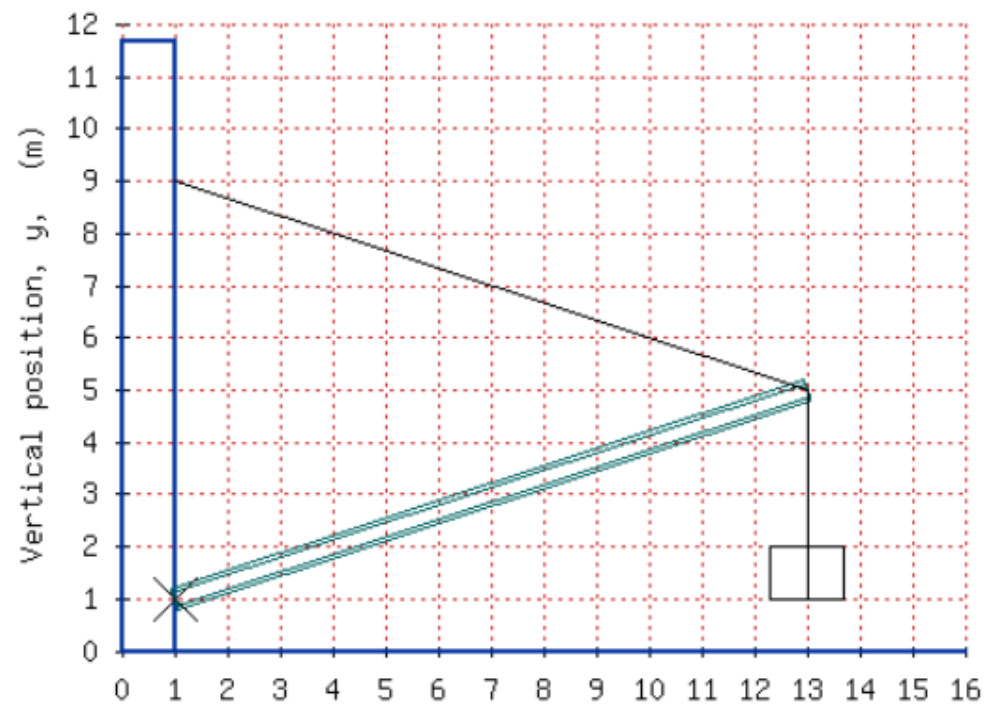
Hausübungen

“Helprooms”

Hausübungen

Randomisierte Probleme

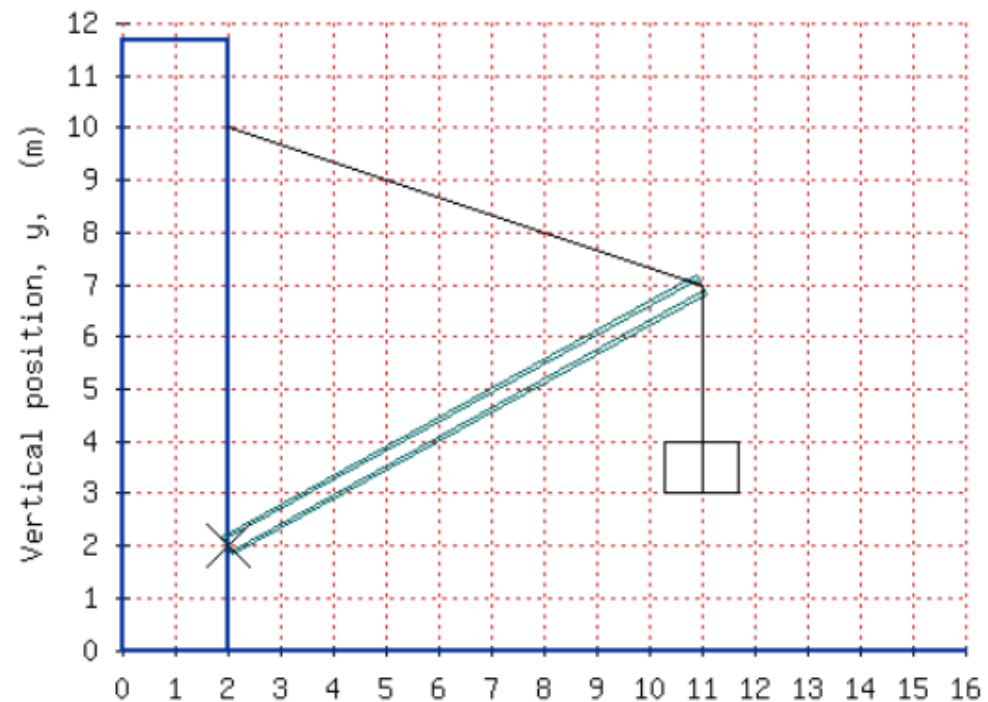
A crate with a mass of 155.5 kg is suspended from the end of a uniform boom with mass of 89.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



Hausübungen

Randomisierte Probleme

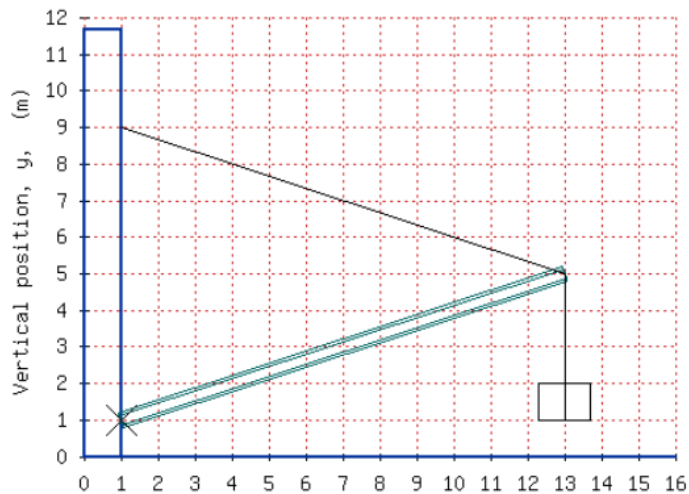
A crate with a mass of 177.5 kg is suspended from the end of a uniform boom with mass of 88.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



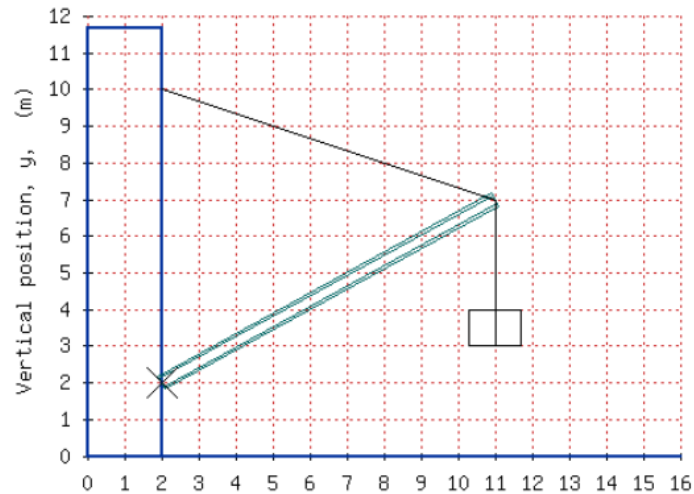
Hausübungen

Randomisierte Probleme: Studierende können und sollen zusammenarbeiten

A crate with a mass of 155.5 kg is suspended from the end of a uniform boom with mass of 89.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



A crate with a mass of 177.5 kg is suspended from the end of a uniform boom with mass of 88.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



Hausübungen

- ... besondere Stärken in Mathematik
 - Einschließlich Unterstützung von
 - LaTeX
 - Maxima
 - R

Give an example of a function

1. which is orthogonal to $6 \cdot \cos(7 \cdot x) - 2 \cdot \sin(2 \cdot x)$ with respect to the scalar product

$$\langle g | h \rangle = \frac{1}{\pi} \int_{-\pi}^{\pi} dx g(x) \cdot h(x)$$

2. whose norm is 1.

cos(2x)+sin(7x)

The function you have provided does not have a norm of one.

Submit Answer Incorrect. Tries 1

What is the derivative of

$$\begin{pmatrix} 4t^3 \\ 8t^8 \end{pmatrix}$$

with respect to t ?

You need to multiply with the original exponent.

Submit Answer Incorrect. Tries 1

Hausübungen

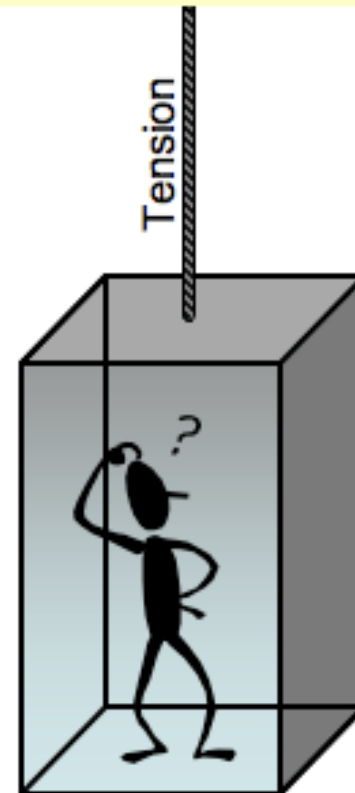
- ... Physikalische Einheiten

Elevator Problem

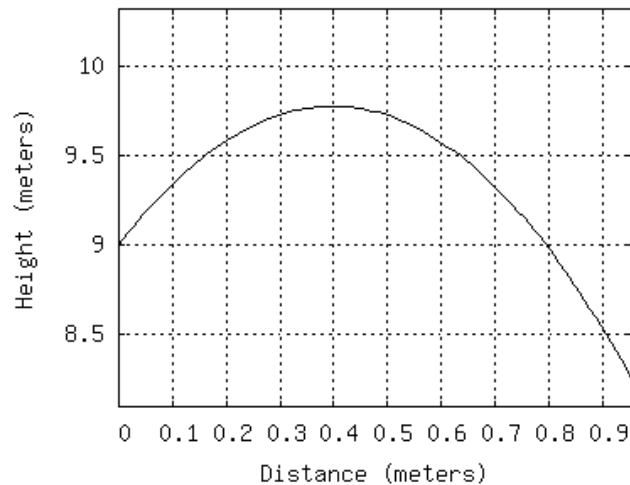
Due never

An elevator (cabin mass 500 kg) is designed for a maximum load of 2600 kg, and to reach a velocity of 3 m/s in 5 s. For this scenario, what is the tension the elevator rope has to withstand?

[Submit Answer](#) Tries 0/99



Online Diskussionen



The plot shows the trajectory (height versus distance) of an object launched at an angle of 75.6 degrees. What was the initial speed of the object? **4.0 m/s**
Computer's answer now shown above. Tries 0/12

[Threaded View](#) [Chronological View](#) [Sorting/Filtering options](#) [Export?](#)

Anonymous 1 (Fri Sep 22 01:26:29 2006 (EDT))

any hints to start?

Re: *Anonymous 2* (Fri Sep 22 01:56:48 2006 (EDT))

You need to find the Y component of velocity... you can do this by finding the height traveled (notice it does not start on the ground) and combining that with acceleration in a kinematics equation. From there use trig to get the original velocity.

Re: Re: *Anonymous 1* (Fri Sep 22 12:10:37 2006 (EDT))

how can we find the height traveled and how can we get the acceleration if we don't have the time?

Anonymous 3 (Fri Sep 22 16:41:27 2006 (EDT))

i'm lost on this one... can anyone help?

Re: *Anonymous 4* (Fri Sep 22 20:02:45 2006 (EDT))

Use the squared kinematics equation - so $V_f^2 = V_i^2 + 2a(X_f - X_i)$.

Diskussionen

Wiederrum:
Peer-Instruction.

Helprooms

- HiWis abends verfügbar
- Kollaborativ
- Peer-Instruction
- Finden Sie den HiWi!



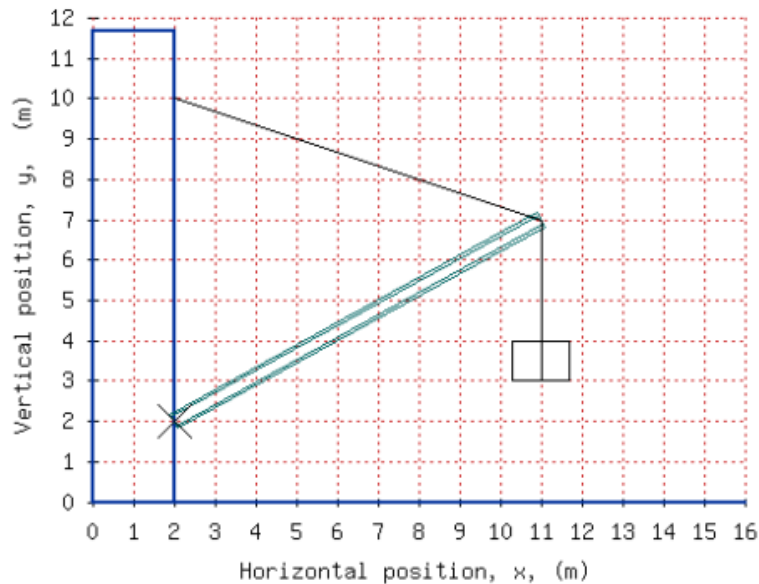


Klausuren

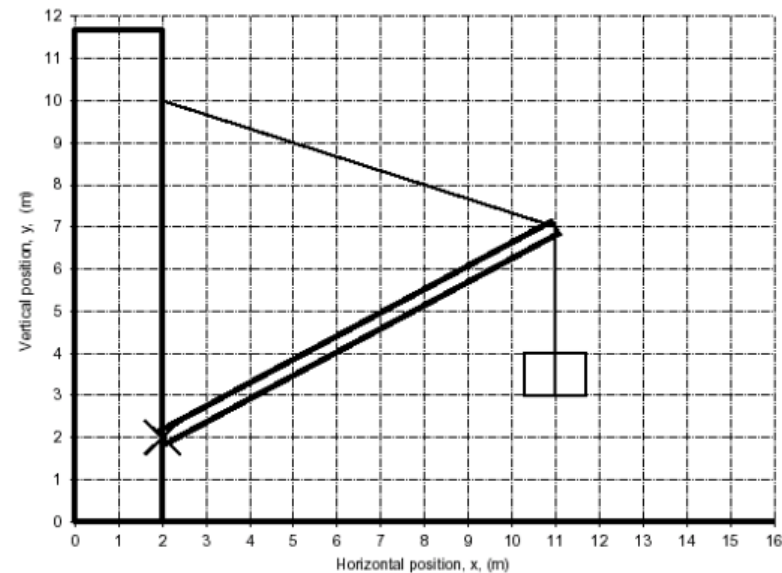
Klausuren

- Definitiv nicht kollaborativ!
- In USA: mangels Personal oft größtenteils “Bubblesheet”
- Jeder Studierende hat eine eigene Version

A crate with a mass of 177.5 kg is suspended from the end of a uniform boom with mass of 88.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



1 pt A crate with a mass of 177.5 kg is suspended from the end of a uniform boom with mass of 88.5 kg. The upper end of the boom is supported by a cable attached to the wall and the lower end by a pivot (marked X) on the same wall. Calculate the tension in the cable.



(in N)

22. A 2.58×10^3 B 2.92×10^3 C 3.29×10^3
 D 3.72×10^3 E 4.21×10^3 F 4.75×10^3
 G 5.37×10^3 H 6.07×10^3

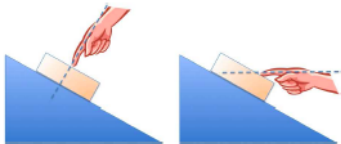
Klausuren

CODE - AACHDA
LB 271 - Introductory Physics Lecture
Version A

Name:

LB271 Fall 2009 Final Exam Version A

| | |
|---------------------------------------|---|
| Gravitational Acceleration on Earth | $g = 9.81 \text{ m/s}^2$ |
| Gravitational Constant | $G = 6.67 \cdot 10^{-11} \text{ m}^3/(\text{kg} \cdot \text{s}^2)$ |
| Absolute Zero | -273.15°C |
| Gas Constant | $R = 8.31 \text{ J}/(\text{K} \cdot \text{mol})$ |
| Boltzmann Constant | $k = 1.38 \cdot 10^{-23} \text{ J/K}$ |
| Avogadro's number | $N_A = 6.02 \cdot 10^{23} \text{ particles/mol}$ |
| Specific heat of water vapor | $c_{\text{vapor}} = 0.48 \text{ kcal}/(\text{kg} \cdot \text{K})$ |
| Specific heat of liquid water | $c_{\text{water}} = 1 \text{ kcal}/(\text{kg} \cdot \text{K})$ $= 4186 \text{ J}/(\text{kg} \cdot \text{K})$ |
| Specific heat of water ice | $c_{\text{ice}} = 0.5 \text{ kcal}/(\text{kg} \cdot \text{K})$ |
| Latent heat of fusion for water | $L_f = 80 \text{ kcal/kg}$ |
| Latent heat of vaporization for water | $L_v = 540 \text{ kcal/kg}$ |



A block is being held in place on an incline. The magnitude of the force applied by the hand on the block is the same in the left and the right scenarios.

1 pt In which scenario does the incline exert a lower normal force on the block?

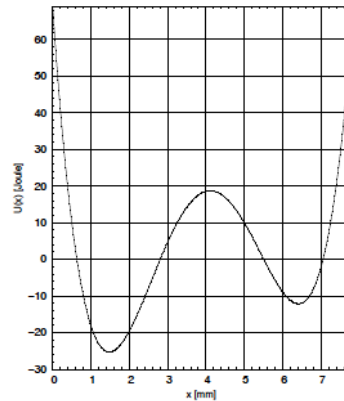
1. A The left scenario.
 B The right scenario.
 C Same in both scenarios.

1 pt In which scenario does the incline exert a lower frictional force on the block?

2. A The left scenario.
 B The right scenario.
 C Same in both scenarios.

1 pt By how many decibels does the sound intensity from a point source decrease if you increase the distance to it by a factor 6?

3. A 12.2 B 13.8 C 15.6 D 17.6
 E 19.9 F 22.5 G 25.4 H 28.7



1 pt A particle is located at $x=2.0 \text{ mm}$ and has a kinetic energy of 29.5 Joule. What is the maximum x-coordinate the particle could reach? (in mm)

4. A 0.1 B 0.7 C 1.6 D 2.6
 E 3.2 F 4.7 G 5.3 H 7.6



Deep Space Nine sees Enterprise and a shuttle approach from exactly opposite directions with $0.8c$ and $0.5c$, respectively.

1 pt At what fraction of the speed of light (β) does Enterprise see the shuttle approach?

5. A 0.00 B 0.50 C 0.83 D 0.91
 E 0.93 F 1.00 G 1.25 H 1.30

1 pt The shuttle has a length of 9 meters when at rest. How long is it in the system of Deep Space 9? (in m)

6. A 1.8 B 2.6 C 3.7 D 5.4
 E 7.8 F 11.3 G 16.4 H 23.8

1 pt Captain Picard on the Enterprise takes a 49 minute tea break. How long is this break in the system of Deep Space 9? (in min)

7. A 27 B 33 C 42 D 52
 E 65 F 82 G 102 H 128

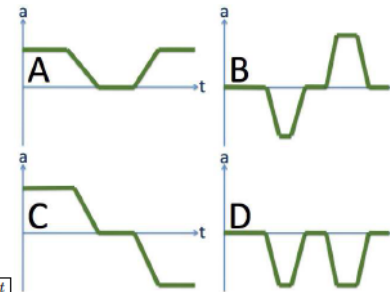
CODE - AACHDA
LB 271 - Introductory Physics Lecture
Version A

1 pt You have two organ pipes of the same length, one closed at both ends, one half open. Which one has a lower fundamental frequency?

8. A The closed pipe.
 B Same.
 C The half-open pipe.

1 pt In a very simple model of the lower atmosphere, air has a constant density of 1.26 kg/m^3 . How much would the air pressure change over a height difference of 130 m? (in Pa)

9. A 986 B 1110 C 1260 D 1420
 E 1610 F 1820 G 2050 H 2320

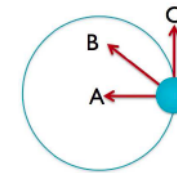


1 pt A car drives in the forward (positive) direction. It first has a constant speed, then drives into a parking spot, waits for a few moments, and then drives out again backwards. Which one of the acceleration graphs could describe this scenario?

10. A Scenario A
 B Scenario B
 C Scenario C
 D Scenario D
 E None of the above.

1 pt A box is sliding uphill as shown. What is the direction of the frictional force on the box?

11. A Downhill.
 B Perpendicular to the surface.
 C Uphill.
 D None of the above.



An object is rotating on a circular trajectory as shown. The indicated direction A is toward the center of the trajectory, C is tangential to the trajectory. The object is **rotating clockwise and slowing down**.

1 pt What could be the direction of the (linear) acceleration?

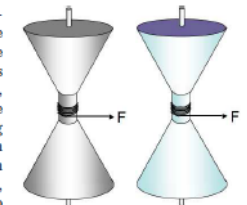
12. A Direction A.
 B Direction B.
 C Direction C.
 D Into the paper.
 E Out of the paper.

1 pt What could be the direction of the angular acceleration?

13. A Direction A.
 B Direction B.
 C Direction C.
 D Into the paper.
 E Out of the paper.

1 pt

You have two identical looking spools (same mass, same shape, same size). However, one is hollow, made from iron, the other is solid, made from aluminum. A string is wound around each spool. If you pull on both strings with equal forces, which spool is going to have the larger angular acceleration?



14. A Same
 B The solid spool
 C The hollow spool

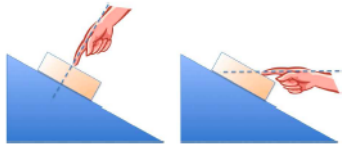
Klausuren

CODE - AAFIHH
LB 271 - Introductory Physics Lecture
Version A

Name:

LB271 Fall 2009 Final Exam Version A

| | |
|---------------------------------------|---|
| Gravitational Acceleration on Earth | $g = 9.81 \text{ m/s}^2$ |
| Gravitational Constant | $G = 6.67 \cdot 10^{-11} \text{ m}^3/(\text{kg} \cdot \text{s}^2)$ |
| Absolute Zero | -273.15°C |
| Gas Constant | $R = 8.31 \text{ J}/(\text{K} \cdot \text{mol})$ |
| Boltzmann Constant | $k = 1.38 \cdot 10^{-23} \text{ J/K}$ |
| Avogadro's number | $N_A = 6.02 \cdot 10^{23} \text{ particles/mol}$ |
| Specific heat of water vapor | $c_{\text{vapor}} = 0.48 \text{ kcal}/(\text{kg} \cdot \text{K})$ |
| Specific heat of liquid water | $c_{\text{water}} = 1 \text{ kcal}/(\text{kg} \cdot \text{K})$ $= 4186 \text{ J}/(\text{kg} \cdot \text{K})$ |
| Specific heat of water ice | $c_{\text{ice}} = 0.5 \text{ kcal}/(\text{kg} \cdot \text{K})$ |
| Latent heat of fusion for water | $L_f = 80 \text{ kcal}/\text{kg}$ |
| Latent heat of vaporization for water | $L_v = 540 \text{ kcal}/\text{kg}$ |



A block is being held in place on an incline. The magnitude of the force applied by the hand on the block is the same in the left and the right scenarios.

1 pt In which scenario does the incline exert a higher frictional force on the block?

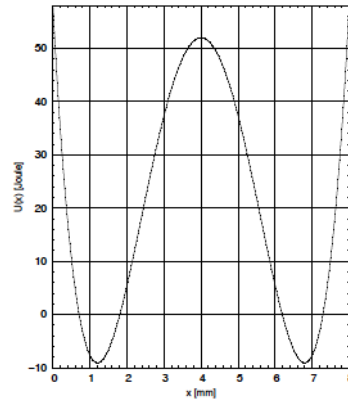
- A The left scenario.
- B The right scenario.
- C Same in both scenarios.

1 pt In which scenario does the incline exert a higher normal force on the block?

- A The left scenario.
- B The right scenario.
- C Same in both scenarios.

1 pt By how many decibels does the sound intensity from a point source decrease if you increase the distance to it by a factor 6?

- A 7.10
- B 8.31
- C 9.72
- D 11.4
- E 13.3
- F 15.6
- G 18.2
- H 21.3



1 pt

A particle is located at $x = 5.5 \text{ mm}$ and has a kinetic energy of 9.8 Joule. What is the minimum x-coordinate the particle could reach? (in mm)

- A 1.6
- B 2.6
- C 2.7
- D 2.9
- E 3.0
- F 3.8
- G 5.2
- H 6.9



Deep Space Nine sees Enterprise and a shuttle approach from exactly opposite directions with $0.8c$ and $0.4c$, respectively.

1 pt At what fraction of the speed of light (β) does Enterprise see the shuttle approach?

- A 0.00
- B 0.47
- C 0.50
- D 0.59
- E 0.78
- F 0.91
- G 1.00
- H 1.20

1 pt The shuttle has a length of 12 meters when at rest. How long is it in the system of Deep Space 9? (in m)

- A 3.6
- B 4.5
- C 5.6
- D 7.0
- E 8.8
- F 11.0
- G 13.7
- H 17.2

1 pt Captain Picard on the Enterprise takes a 35 minute tea break. How long is this break in the system of Deep Space 9? (in min)

- A 19
- B 28
- C 40
- D 58
- E 85
- F 123
- G 178
- H 258

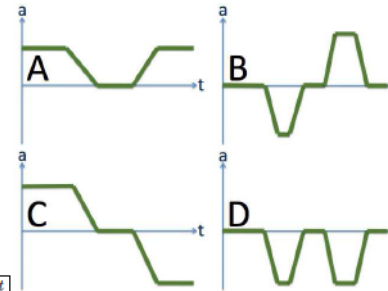
CODE - AAFIHH
LB 271 - Introductory Physics Lecture
Version A

1 pt You have two organ pipes of the same length, one closed at both ends, one half open. Which one has a lower fundamental frequency?

- A Same.
- B The closed pipe.
- C The half-open pipe.

1 pt In a very simple model of the lower atmosphere, air has a constant density of 1.22 kg/m^3 . How much would the air pressure change over a height difference of 110 m? (in Pa)

- A 1320
- B 1490
- C 1680
- D 1900
- E 2150
- F 2430
- G 2740
- H 3100



1 pt

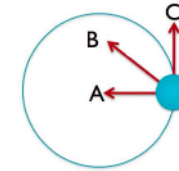
A car drives in the forward (positive) direction. It first has a constant speed, then drives into a parking spot, waits for a few moments, and then drives out again backwards. Which one of the acceleration graphs could describe this scenario?

- A Scenario A
- B Scenario B
- C Scenario C
- D Scenario D
- E None of the above.

1 pt

A box is sliding uphill as shown. What is the direction of the frictional force on the box?

- A Perpendicular to the surface.
- B Downhill.
- C Uphill.
- D None of the above.



An object is rotating on a circular trajectory as shown. The indicated direction A is toward the center of the trajectory, C is tangential to the trajectory. The object is **rotating clockwise** and **slowing down**.

1 pt What could be the direction of the (linear) acceleration?

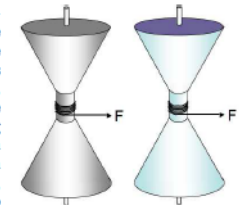
- A Direction A.
- B Direction B.
- C Direction C.
- D Into the paper.
- E Out of the paper.

1 pt What could be the direction of the angular acceleration?

- A Direction A.
- B Direction B.
- C Direction C.
- D Into the paper.
- E Out of the paper.

1 pt

You have two identical looking spools (same mass, same shape, same size). However, one is hollow, made from iron, the other is solid, made from aluminum. A string is wound around each spool. If you pull on both strings with equal forces, which spool is going to have the larger angular acceleration?



- A The solid spool
- B The hollow spool
- C Same

Klausuren

CODE - AACHDA
LB 271 - Introductory Physics Lecture
Version A

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| YOUR LAST NAME | | | | | | | | | | F.I. | A | | | | | | | | | | | |
| A | A | A | A | A | A | A | A | A | A | A | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B | B | B | B | B | B | B | B | B | B | B | B | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| C | C | C | C | C | C | C | C | C | C | C | C | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | |
| D | D | D | D | D | D | D | D | D | D | D | D | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | |
| E | E | E | E | E | E | E | E | E | E | E | E | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | |
| F | F | F | F | F | F | F | F | F | F | F | F | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | | |
| G | G | G | G | G | G | G | G | G | G | G | G | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | | | |
| H | H | H | H | H | H | H | H | H | H | H | H | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | | | |
| I | I | I | I | I | I | I | I | I | I | I | I | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | |
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| | | | | | | | | | | SECTION CODE | | | | | | | | | | | | |
| K | K | K | K | K | K | K | K | K | K | K | K | D | 0 | 0 | 0 | A | A | A | A | | | |
| L | L | L | L | L | L | L | L | L | L | L | L | L | 1 | 1 | 1 | B | B | B | B | | | |
| M | M | M | M | M | M | M | M | M | M | M | M | M | 2 | 2 | 2 | C | C | C | C | | | |
| N | N | N | N | N | N | N | N | N | N | N | N | N | 3 | 3 | 3 | D | D | D | D | | | |
| O | O | O | O | O | O | O | O | O | O | O | O | O | 4 | 4 | 4 | E | E | E | E | | | |
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| Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | 6 | 6 | 6 | G | G | G | G | | | |
| R | R | R | R | R | R | R | R | R | R | R | R | R | 7 | 7 | 7 | H | H | H | H | | | |
| S | S | S | S | S | S | S | S | S | S | S | S | S | 8 | 8 | 8 | I | I | I | I | | | |
| T | T | T | T | T | T | T | T | T | T | T | T | T | 9 | 9 | 9 | J | J | J | J | | | |
| U | U | U | U | U | U | U | U | U | U | U | U | U | FORM | | | | | | | | | |
| V | V | V | V | V | V | V | V | V | V | V | V | V | 1 | A | | | | | | | | |
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| X | X | X | X | X | X | X | X | X | X | X | X | X | 3 | C | | | | | | | | |
| Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | 4 | D | | | | | | | | |
| Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z | | | | | | | | | | |

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| 3 | A | B | C | D | E | F | G | H | I | J | 17 | A | B | C | D | E | F | G | H | I | J |
| 4 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 18 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| 9 | A | B | C | D | E | F | G | H | I | J | 23 | A | B | C | D | E | F | G | H | I | J |
| 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 24 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | A | B | C | D | E | F | G | H | I | J | 25 | A | B | C | D | E | F | G | H | I | J |
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| 13 | A | B | C | D | E | F | G | H | I | J | 27 | A | B | C | D | E | F | G | H | I | J |
| 14 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 28 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Klausuren

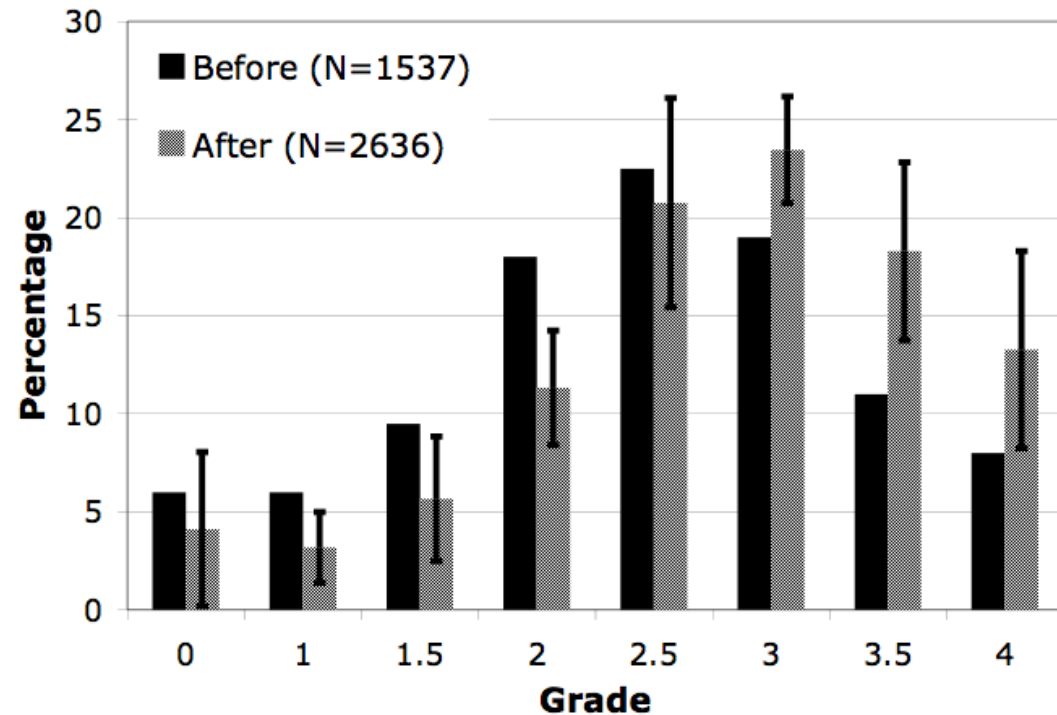
- Technologie erlaubt es, häufiger kleinere Klausuren zu geben
- Früherkennung von Problemen
- Studierende fallen nicht hinterher
- Ein “Ausrutscher” keine Tragödie
- Wird von Studierenden klar bevorzugt in Kursevaluationen

Bevor wir weitermachen ...

... hilft das alles eigentlich?

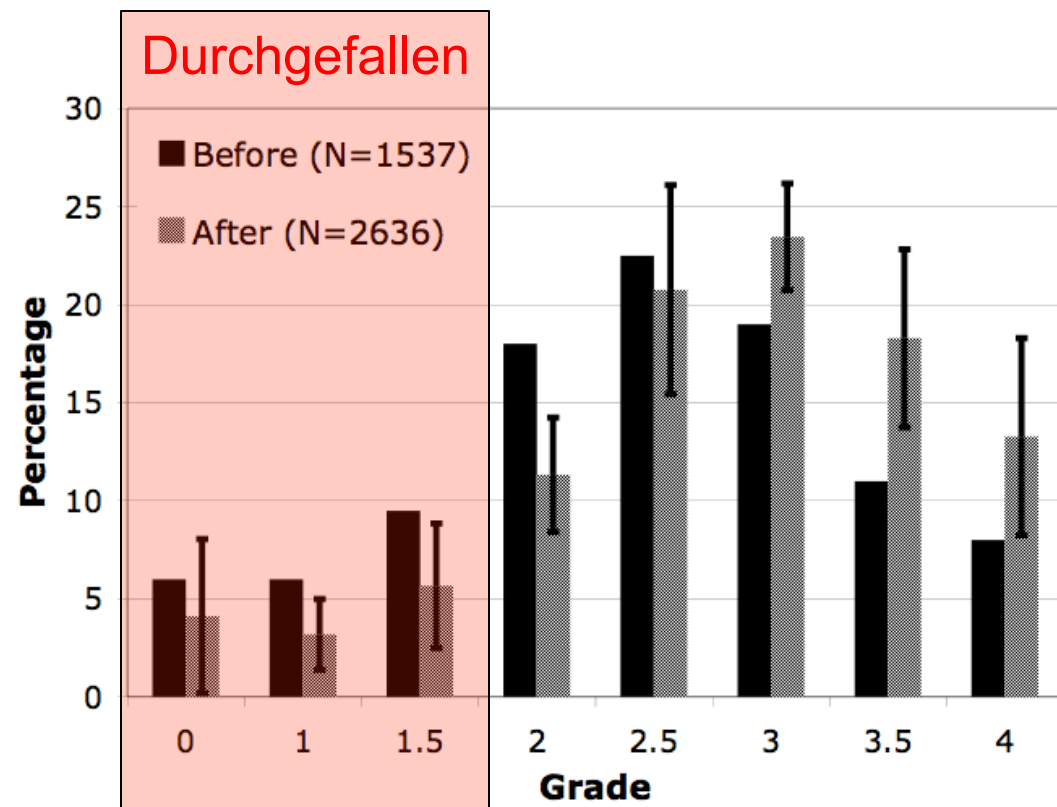
Lernerfolg

- Einführender Physikkurs für Nebenfächler
- Noten vor und nach der Einführung von online Hausübungen



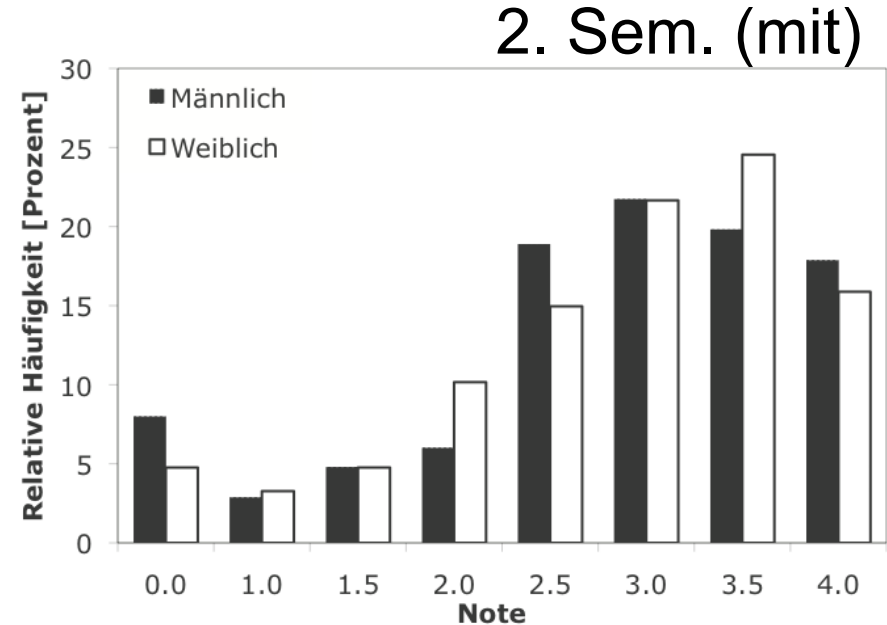
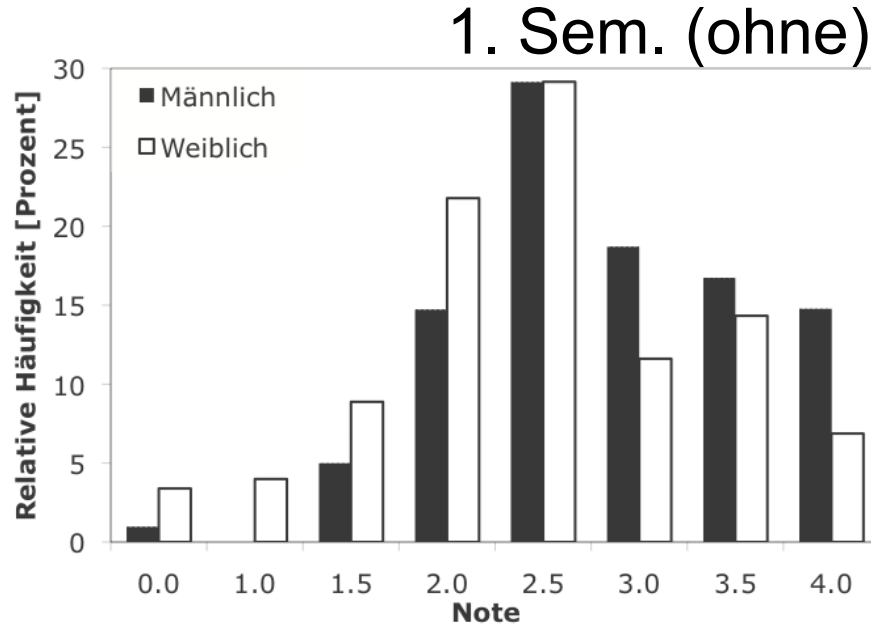
Lernerfolg

Hilft besonders Studierenden, die auf der Schwelle zum Durchfallen stehen.



Lernerfolg

- Geschlechterspezifisch (anderer Physikkurs)



Wie ist der realistisch möglich?

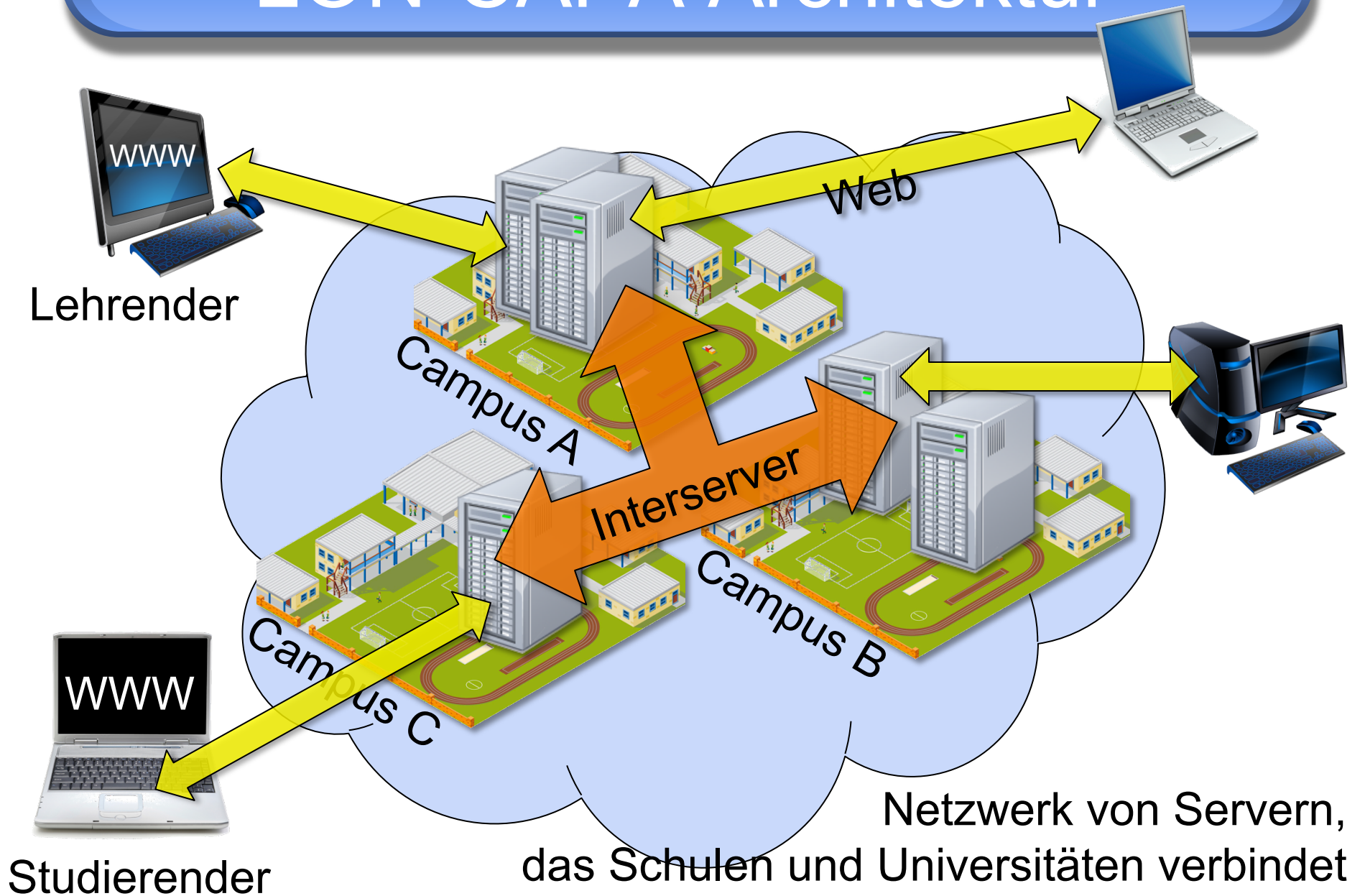
Das verlangt sehr viele Aufgaben!

Wiederverwendung

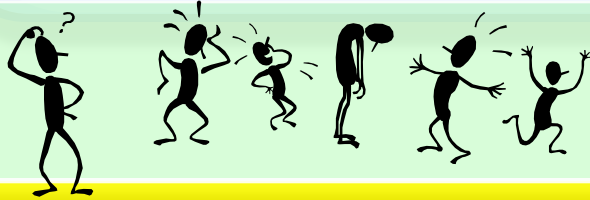
- Das Erstellen von online Materialien ist viel Arbeit
- Zuviel Arbeit für einen einzigen Kurs
- Viele Materialien sind leicht zwischen Kursen und Institutionen austauschbar



LON-CAPA Architektur



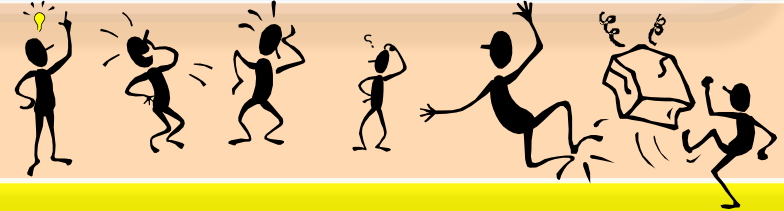
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Kursverwaltung

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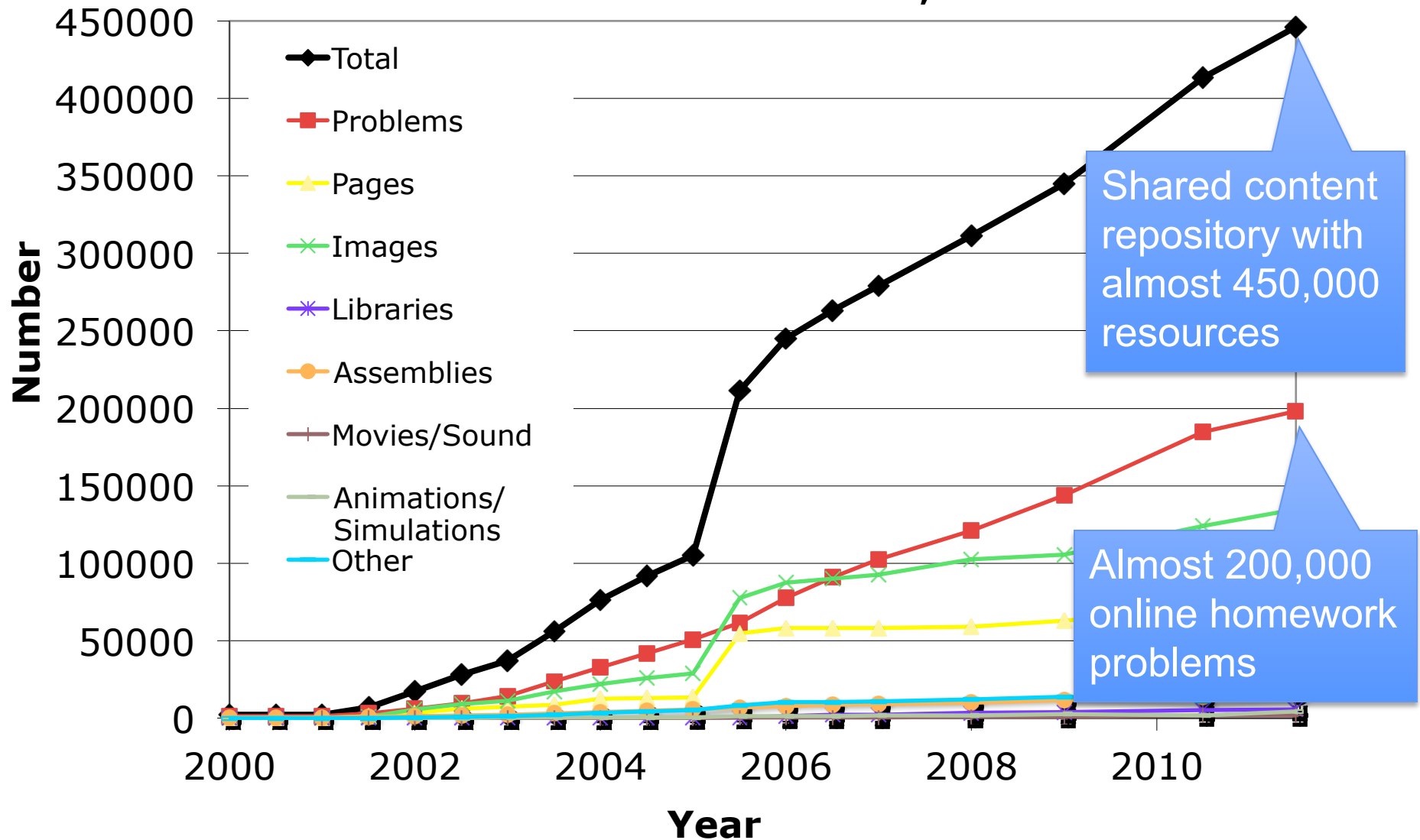
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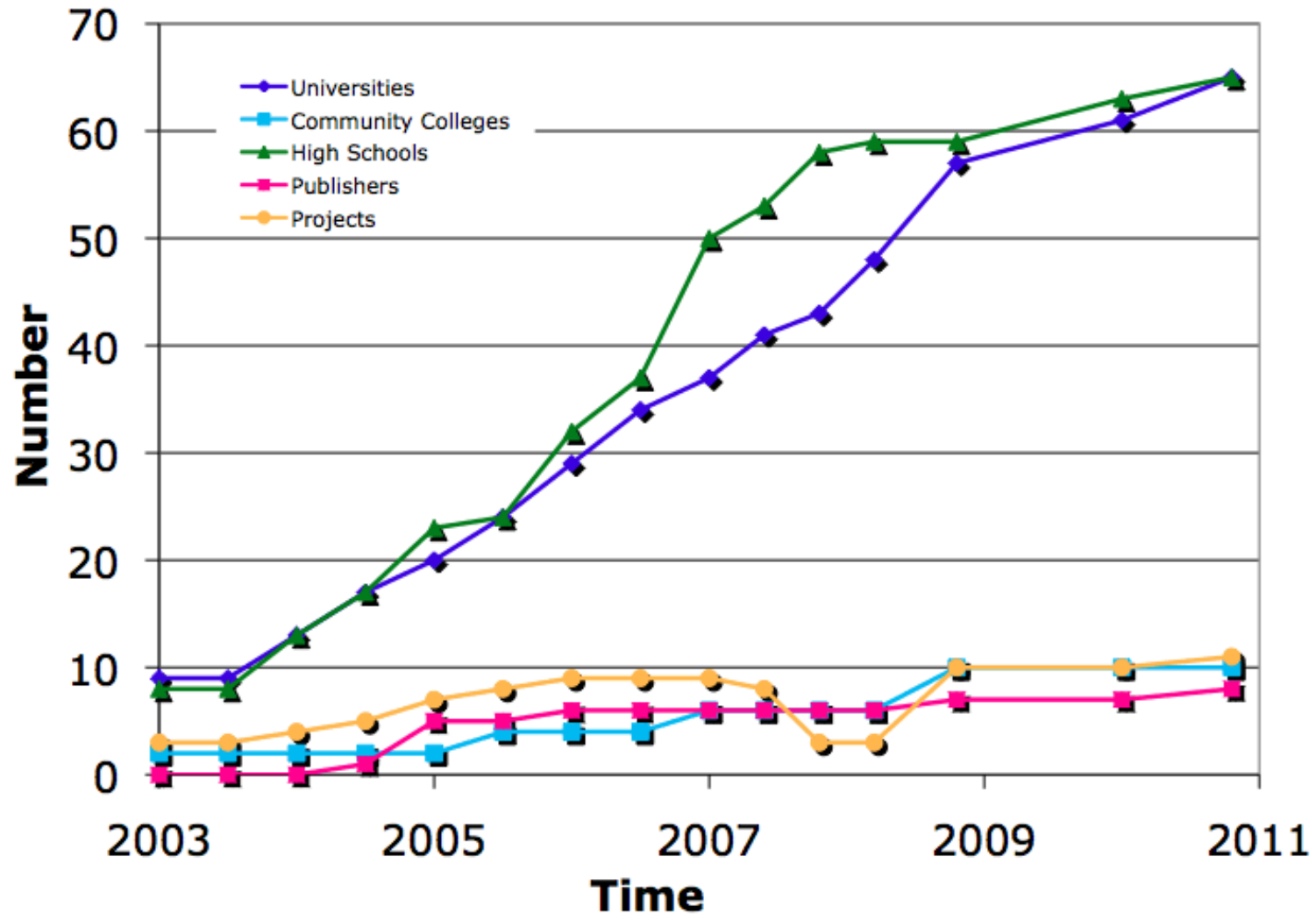
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LON-CAPA Shared Resource Pool, Summer 2011

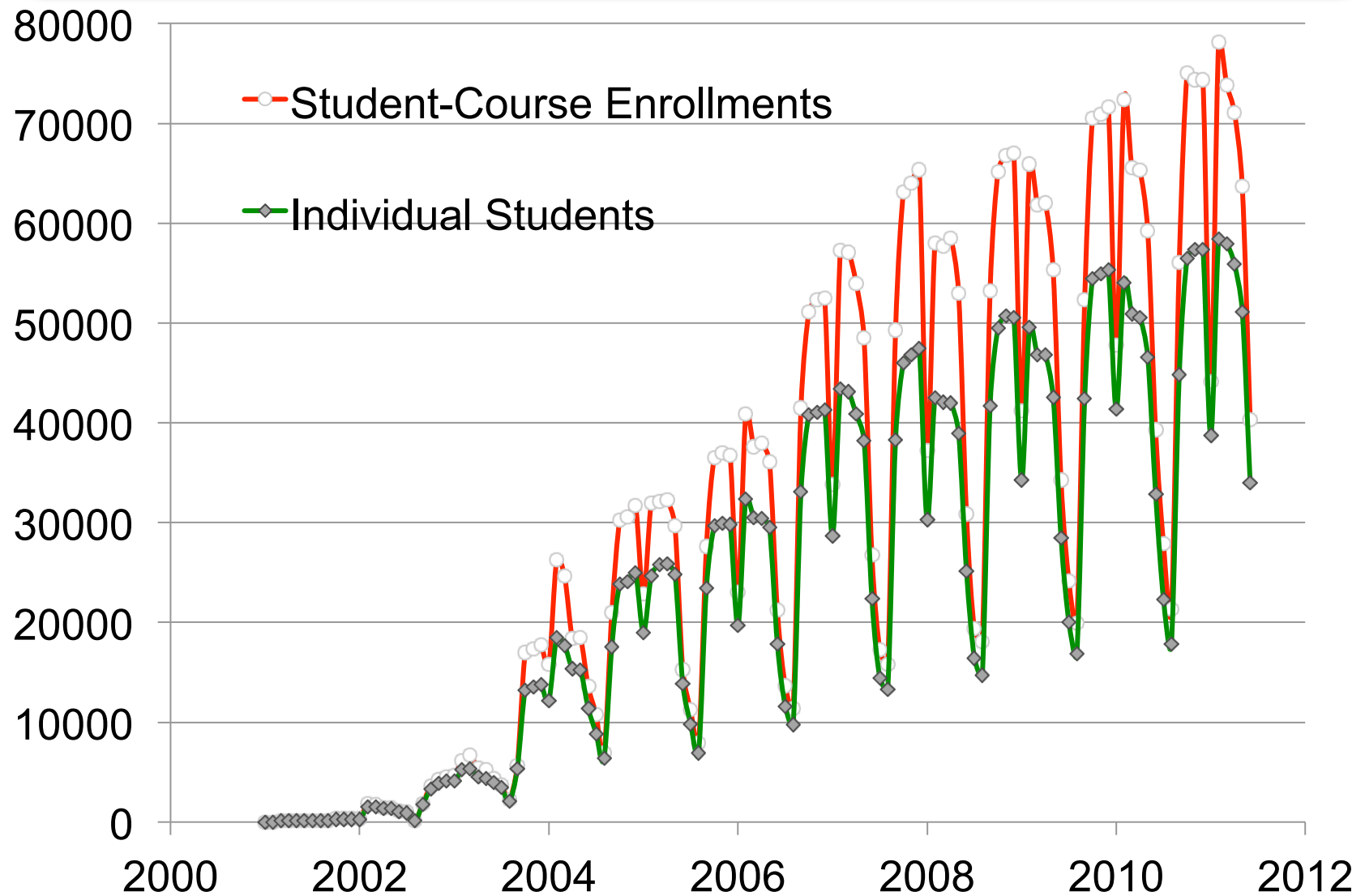


Die LON-CAPA Gemeinschaft

LON-CAPA Domains



LON-CAPA Einschreibungen



In Arbeit: Empfehlungssystem

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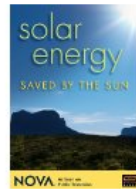
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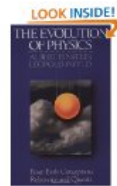
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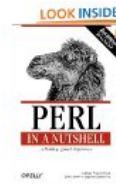
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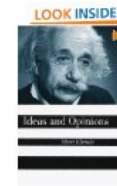
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Neue Richtung: Offene Kurse

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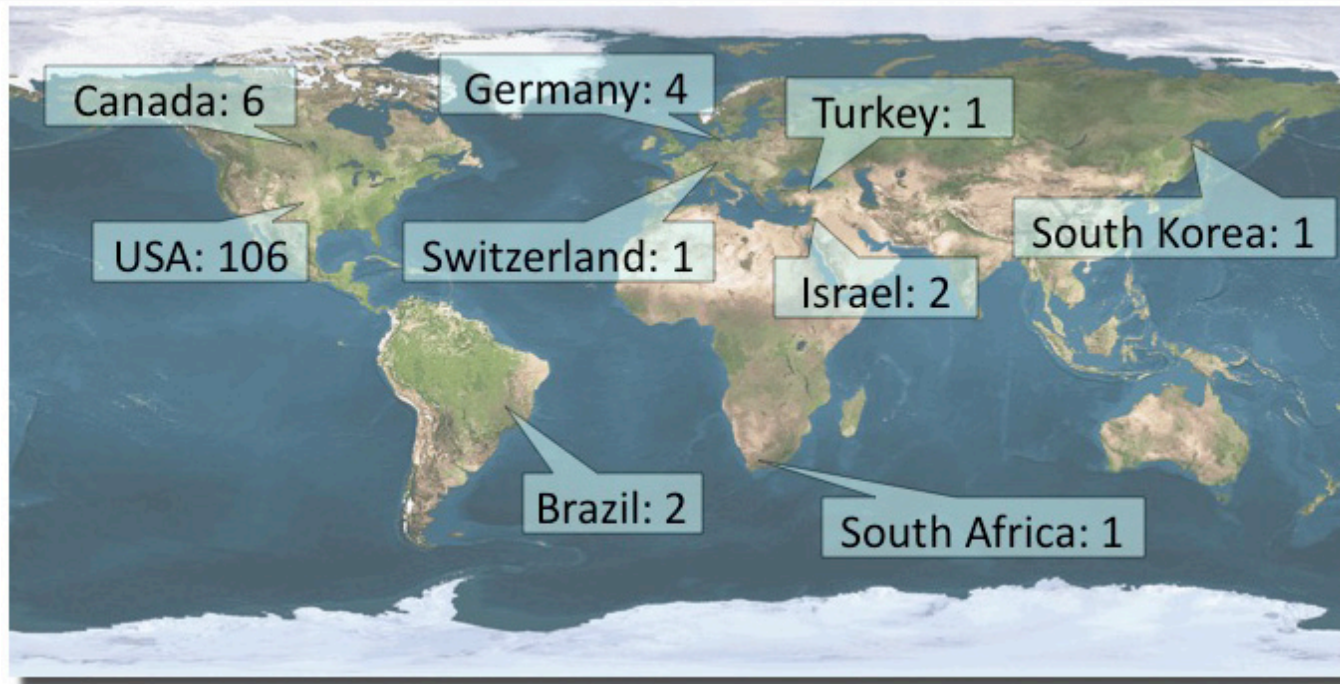
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- ▶  Quiz on Unit 8
- ▶  Unit 9: Torque and Rotation about a Fixed Axis
- ▶  Unit 9 Homework: Torque and Rotation about a Fixed Axis
- ▼  Unit 10: Describing Rotational and Translational Motion
 -  Describing Rotational and Translational Motion
 -  Video: Translation and Rotation of a Rigid Body
 - ▼  Applying Newton's Second Law in General Rotations
 -  Dynamics of Rigid Bodies
 -  CheckPoint 1: Clockwise or Counterclockwise? → Due by Friday, Apr 20 at 01:00 pm (EDT)
 - ▶  Rolling Constraints
 - ▶  Rotational Energy
 -  Video: Rotation and Translation
 - End of Unit 10
- ▶  Unit 10 Homework: Describing Rotational and Translational Motion
- ▶  Quiz on Unit 9 and Unit 10 (hidden)

Nur in den USA?



Nur in den USA?



- Im Moment hauptsächlich in Nordamerika
- Einige Installationen in Deutschland

Deutschland?

- Einwände in Deutschland
 - Verschulung der Lehre
 - „Deutsche Professoren teilen lieber ihre Zahnbürste als ihre Vorlesungsskripte“



Universität Frankfurt

- Universität Frankfurt
- Physik für Pharmazeuten, Biologen, Physiker
- Online Text und Hausübungen

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Course Contents » ... » Ströme » Die Kirchhoffschen

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Die Kirchhoffschen Regeln

Es gibt Stromkreise wie den in der Abbildung rechts, die wir mit unseren bisherigen Regeln nicht auf einen einzigen Ersatzwiderstand reduzieren können. Was ist dann zu tun?

Glücklicherweise gibt es in diesem Fall zwei nach Kirchhoff benannte Regeln, die uns ermöglichen, alle möglichen Stromkreise mit einer beliebigen Anordnung von Widerständen und Batterien (oder allgemeiner, externen Quellen von Potentialdifferenzen) zu lösen. Die **Kirchhoffschen Regeln**, wie sie hier dargestellt sind, können nicht auf Stromkreise mit "aktiven Komponenten" (wie Transistoren oder Verstärkern) angewendet werden. Auch für "nicht-ohmsche" Komponenten können sie nicht angewandt werden. Sie funktionieren nur bei sogenannten "**linearen**" (oder "passiven") **Komponenten**.

Regel 1:

Der Gesamtstrom, der in eine Verzweigung hineinfließt, muß gleich dem Gesamtstrom sein, der aus dieser Verzweigung herausfließt:

$$\sum_j I_j = 0.$$

Diese Regel sagt uns, daß die Summe aller Ströme an einem gegebenen Punkt gerade gleich Null ist, wobei einfließende Ströme positiv und ausfließende Ströme negativ zu zählen sind. Die Aussage ist also im wesentlichen: "Was hinein geht, muß auch wieder herauskommen" - dies ist

→ Open, no due date
→ Open, no due date
→ Open, no due date


Niedersächsische Hochschulen

- Ostfalia
- Hannover
- Lübeck

Salzgitter
Suderburg
Wolfenbüttel
Wolfsburg

Kontakt, Suche, Anreise
Englisch
Schriftgröße [=] [-] [+]

Ostfalia
Hochschule für angewandte
Wissenschaften



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➔ Alumni

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Zell

Angebot für Lehrende

Das Zentrum für erfolgreiches Lehren und Lernen (ZeLL) der Ostfalia

Vita

VITA - Ein Projekt zur Nutzung rechnerunterstützter Übungen in der Lehre

Non scholae, sed vitae discimus. Auch wenn Seneca diesen Satz so nicht geschrieben hat, ist seine Aussage unumstritten: Lernen ist lebenswichtig. Integraler Bestandteil jedes Lernprozesses ist das Üben. Dieses kommt heute in der Hochschulausbildung leider etwas zu kurz. Die Gründe sind vielfältig, aber in der Mehrzahl auf Ressourcenmangel zurückzuführen. VITA greift hier an, um durch Rechnerunterstützung den Übungsanteil am Lernprozess zu stärken.



VITA ist ein Projekt, das

- Übungsmaterialien für rechnerunterstützte Übungen entwickelt.
- elektronische Plattformen, die rechnerunterstützte Übungen ermöglichen, weiterentwickelt und dabei die aktuellen Bedürfnisse der Lehre einfließen lässt.
- didaktische Szenarien untersucht, in denen sich rechnerunterstützte Übungen besonders effektiv einsetzen lassen.

e, die wirkt.

GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung

Medizinische Hochschule

- Medizinische Hochschule Hannover
 - Übungsaufgaben, “Physik für Mediziner”



Karlsruhe

- Karlsruhe Institut für Technologie
 - wird gerade eingerichtet



SUCHEN

Studium/Beruf und
Familie Öffentliche
Wissenschaft KIT-Zentren KIT-
Kollektion KIT-Business-Club
Technologieangebote
Promotion **Vorlesungen**
Studienberatung Info zu
Fukushima
Kompetenzportfolio

Das KIT Besuchen Studieren Forschen Kooperieren Fördern

Infrastrukturen für das 3. Jahrtausend

1972 Gründung der ersten Fakultät für Informatik in Deutschland an der Universität Karlsruhe (TH)

2012 40 Jahre Angewandte Informatik am Karlsruher Institut für Technologie (KIT)

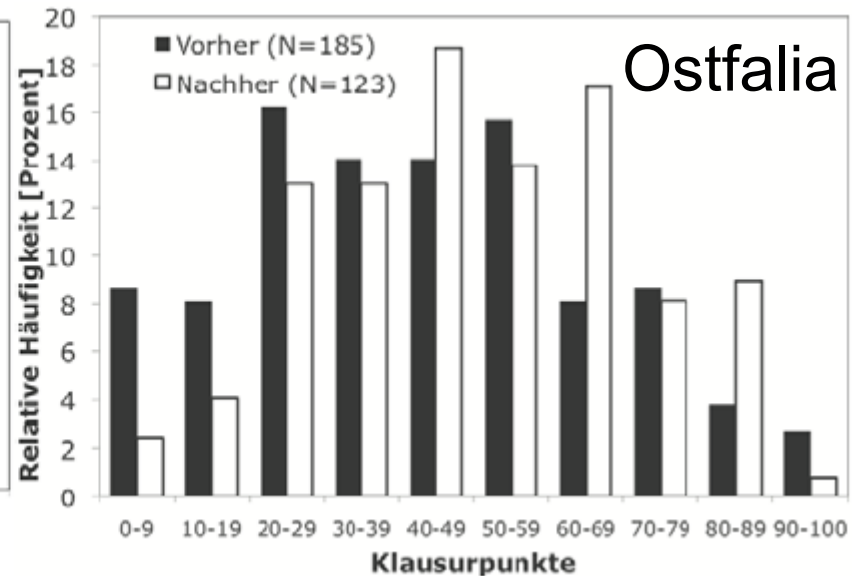
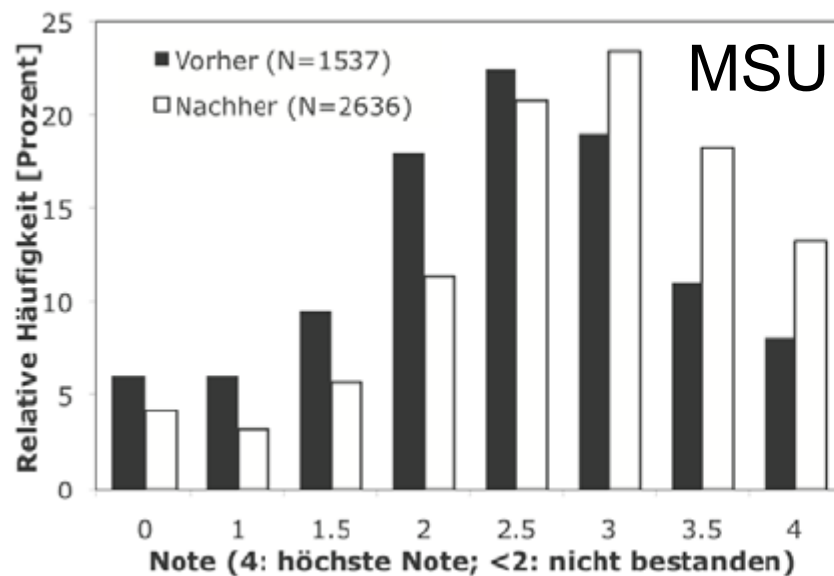
1970 1980 1990 2010

KIT – Kompetenz in IT

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Vergleichsstudien

- Effizienz in Deutschland?



Vergleichsstudien

- Gerd Kortemeyer and Peter Riegler, *Large-Scale E-Assessments, Prüfungsvor- und -nachbereitung: Erfahrungen aus den USA und aus Deutschland, Zeitschrift für E-Learning, Volume 5, Issue 1, (2010)*
- Peter Riegler and Gerd Kortemeyer, *Praxisbericht: Mehrwert freier elektronischer Übungsaufgaben in MINT-Fächern, Zeitschrift für E-Learning, Volume 5, Issue 3, (2010)*
- Peter Riegler and Gerd Kortemeyer, *Gender Differences in Computer Aided Assessments, Wismarer Frege Reihe (Wismar Frege Series), Heft 03/2010, 23-28 (2010)*
- Susanne Bellmer, Gerd Kortemeyer, and Peter Riegler, *Computerbewertete Übungen in mathematischen, technischen und naturwissenschaftlichen Grundlagenfächern, in Auf dem Weg zu exzellentem E-Learning - Kooperation und Vernetzung der Hochschullehre in Niedersachsen (Hans-Jürgen Appelrath and Leonore Schulze (ed.)), Waxmann Verlag (Münster, New York, München, Berlin), ISBN 978-3-8309-2122-6 (2009)*

Fazit: Kein signifikanter Unterschied im Technologieeinsatz zwischen amerikanischen und deutschen Studierenden

Vielen Dank!

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