Theoretische Physik 1 - WS 2015/2016
Theoretische Mechanik

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Mo 10:00 - 12:00, Fr 10:00 - 12:00
(HS Kernphysik)

website:
http://wwwth.kph.uni-mainz.de/1548.php

KLAUSUR :
16/02/2016, 9:00 - 12:00 Uhr

Overview

- **W1:** Newton's laws
- **W2:** 2-body system with internal forces, Kepler problem
- **W3:** many-body systems, conservative force fields, conservation laws, Galilei transformation
- **W4:** rotating reference systems, 1-dimensional motion of a point particle, phase space, harmonic oscillator (with damping, free and driven)
- **W5:** planar pendulum, integrating 1-dimensional equations of motion, bodies of finite extension
- **W6:** d'Alembert's principle, Lagrange's equations
- **W7:** variational calculus, Hamilton's variational principle, Euler-Lagrange equations
- **W8:** canonically conjugate momentum, Legendre transformation, Hamiltonian function, canonical equations and systems
- **W9:** symmetries and conservation laws, Noether's theorem, canonical transformations, Poisson bracket

- **W10:** theorem of Liouville, rigid bodies: definition, kinetic energy, tensor of inertia
- **W11:** tensor of inertia: properties, moments of inertia, examples, angular momentum, force free motion of rigid bodies
- **W12:** rotations of rigid bodies, Euler's equations of motion
- **W13:** Euler's equations for force-free top
- **W14:**

Literature

1. Florian Scheck
   Mechanics, 5th edition
   (Springer)

2. Wolfgang Nolting
   Grundkurs Theoretische Physik 1, 10. Auflage
   (Springer Spektrum)

3. Goldstein, Poole & Safko
   Classical Mechanics, 3rd edition
   (Addison Wesley)