

Übungen zur
Computational Nanoscience

– Blatt 3 –

Prof. Dr. Alexander Lichtenstein
zum 27.04.2016

Aufgabe 1) Action

Calculate the classical action for a one-dimensional free particle of mass m .

Aufgabe 2) Lagrange

Write the Lagrange equation of motion for pendulum.

Aufgabe 3) Hamilton

For the following Hamilton function:

$$H = q_1 p_1 - q_2 p_2 - \alpha q_1^2 + \beta q_2^2$$

with α and β - constants, write the equation of motion and shows that the following functions are the integrals of motion:

$$f_1 = q_1 q_2$$

$$f_2 = q_1 e^{-t}$$

$$f_3 = (p_2 - \beta q_2)/q_1$$