

Übungen zur
Computational Nanoscience

– Blatt 5 –

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Aufgabe 1) Hermitian operator

Proof that eigenvalues of Hermitian operators are real.

Aufgabe 2) Time evolution operator

Calculate the action of time evolution operator:

$$e^{-i\hat{H}t/\hbar}$$

with time-independent Hamiltonian $\hat{H}$ on eigenstates $|n\rangle$ of $\hat{H}$ with:

$$\hat{H}|n\rangle = E_n|n\rangle$$

Aufgabe 3) Unitary evolution

Proof that time evolution of wave function with the Euler scheme is not unitary evolution and not conserved the norm of the wave function