Examination topics
Mathematical topics in many body quantum physics
Winter Semester 2018/19

1. Difference between a Hermitian (symmetric) and a self-adjoint operator.

2. Min-max principle and its consequences.

3. Discrete and essential spectrum of 1-body Schrödinger operators.

4. Weyl asymptotics of the number of eigenvalues of a Schrödinger operator.

5. N body Schrödinger operator and the HVZ Theorem about its essential spectrum.

6. Scattering theory for 1-body Schrödinger operators.

7. Scattering theory for N body Schrödinger operators.

8. Bosonic Fock spaces, creation/annihilation operators.

9. Fermionic Fock spaces, creation/annihilation operators.

10. Wick quantization.

11. Slater determinants, ground state of a quadratic fermionic Hamiltonian.

12. Hartree-Fock method.

13. Bogoliubov approximation for the Bose gas.

14. Landau's argument for superfluidity.