

Examination topics of
Algebraic Methods in Quantum Theory
Jan Dereziński, Winter Semester 2025/26

1. Finite dimensional $*$ -algebras.
2. Banach algebras, spectrum.
3. C^* -algebras.
4. Von Neuman algebras.
5. Positive elements in and states on C^* -algebras.
6. GNS representation.
7. Topologies in $B(\mathcal{H})$.
8. Tensor product of vector spaces and of Hilbert spaces.
9. Fock spaces, creation/annihilation operators.
10. Exponential property of Fock spaces.
11. Wick monomials, quantum gas with two-body interaction.
12. Slater determinant and changing the fermionic vacuum.
13. The Hartree-Fock method.
14. Thermal states and the KMS condition.
15. UHF C^* -algebras and quasi-local C^* -algebras.
16. CAR algebras and fermionic quasifree states.