

Exercise Sheet 7 for Advanced Algorithms, Summer 2025

Hand In: Until 2025-07-02 18:00, on ILIAS.

Problem 1

20 + 30 + 20 + 20 points

Recall the randomized complexity classes from class.

Prove the following relations.

a) $P \subseteq ZPP \subseteq RP \subseteq BPP \subseteq PP$

b) $RP \subseteq NP$

Hint: Recall the *probabilistic method*.

c) $ZPP = RP \cap \text{co-RP}$

d) $NP \subseteq \text{co-RP} \implies NP = ZPP$