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POSITIVE POLYNOMIALS AND MOMENT PROBLEMS–SS 2019

Recap Sheet 3

This recap sheet aims to self-assess your progress and to recap some of the definitions and concepts introduced in the previous lectures. You do **not** *need to hand in solutions, but please try to answer as many questions as you can since this is a very good training in preparation of your final exam. If you should have any problem, please do not hesitate to attend Maria's office hours on Wednesdays 2-3 pm in room F408.*

1) Recall the definition of Radon measure on a Hausdorff space. Are probability measures on $(\mathbb{R}^n, \tau_{\text{eucl}})$ always Radon measures?

2) Give examples of full and truncated moment sequences.

3) Relate moment sequences to Riesz' functionals.

4) Recall the definition of the topology $\tau_{X(A)}$ on $X(A)$ for a unital commutative $\mathbb{R}$–algebra A. How does $\tau_{X(A)}$ relate to the product topology on $\mathbb{R}^A$?

5) State the K–moment problem in its general formulation. Why does this generalize the $n-$dimensional $K-$moment problem?

6) Give an example of a unital commutative $\mathbb{R}$–algebra other than the polynomial algebra $\mathbb{R}[X_i : i \in \Omega]$ with Ω an arbitrary index set.

7) State the Classical Riesz-Haviland Theorem. How can it be deduced from Theorem 2.2.2?

8) How the assumptions of the General Riesz-Haviland Theorem relate to the local compactness of the support of the representing measure?

9) Dissect the proof of Theorem 2.2.3 and work out the main ideas.