Advanced Computational Algebraic Geometry
Fachrichtung 6.1 — Mathematik
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List of the topics discussed during the exercise sessions

8/5 Details on the BGG correspondence for complexes of modules and adjointness of **R** and **L**.

15/5 Details of: $M_{\geq r}$ has a linear resolution and $\mathbf{R}(M_{\geq r})$ is acyclic for $r \geq \operatorname{reg} M$; computation of the cohomology groups of $\Omega^i_{\mathbb{P}^n}(j)$.

22/5 Remarks on the Beilinson window; prove of the fact that the matrix given at the end of the lecture gives rise to a vector bundle (the Horrocks-Mumford).

28/5 Why can we detect a vector bundle in a finite computation? And a few remarks on Chow forms.

12/6 Verify that a sheaf with a linear resolution is an Ulrich sheaf; prove that if X has an Ulrich sheaf, also its Veronese embeddings do.

18/6 Facets, outer facets and supporting hyperplanes of the Boij-Söderberg cone of Betti tables; an example.

3/7 Cohomology tables of supernatural vector bundles; decomposing $\mathcal{I}_p$, ideal sheaf of a point in $\mathbb{P}^2$, into supernatural vector bundles.

17/7 The key point in the Boij-Söderberg Theorem is the positivity of the $<F, \mathcal{E}>$ and its “truncated variants”: let’s prove it.