SET–THEORETIC METHODS IN MODULE THEORY

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Brief program of a lecture series for a PhD course at the University of Verona:

1. Filtrations, approximations, and deconstructibility. Eklof and Hill Lemmas.

2. Direct limits, the small object argument and its applications. Inverse limits, boundaries for the dual theory.

3. The regular cardinal case - use of diamond principles. Uniformization and independence of deconstructibility.

4. The singular cardinal case, Shelah's Singular Compactness Theorem.

5. Tree modules and their applications to Mittag-Leffler conditions and to the Auslander problem.

References

[1] L. Angeleri Hügel, J. Šaroch, J. Trlifaj, *Approximations and Mittag-Leffler conditions*, preprint (2014).

[2] P. C. Eklof, *Shelah's singular compactness theorem*, Publ. Math. **52**(2008), 3–18.

[3] P. C. Eklof and A. H. Mekler, **Almost Free Modules**, rev. ed., North-Holland Math. Library, Elsevier, Amsterdam 2002.

[4] R. Göbel and J. Trlifaj, **Approximations and Endomorphism Algebras of Modules**, 2nd rev. ext. ed., W. de Gruyter, GEM **41**, Berlin 2012.

[5] J. Šaroch, *On the non-existence of right almost split maps*, preprint, arXiv: 1504.01631v3.

[6] A.Slávik, J.Trlifaj, *Approximations and locally free modules*, Bull. London Math. Soc. 46(2014), 76-90.