Stability Theory and Algebraic Geometry
Oral Qualifying Exam Syllabus

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1 Model Theory

- Completeness and Compactness Theorems [CK73, Sec. 2.1]
- Omitting Types and Beth's Definability Theorems [CK73, Sec. 2.2]
- Atomic and Prime Models [CK73, Sec. 2.3]
- ω-categorical theories [CK73, Sec. 2.3]
- Quantifier Elimination for ACF, RCF, and DCF [MMP96, I §2,II §2]
- Saturated Models [CK73, Sec. 2.3]

2 Stability Theory

- Strongly Minimal Sets [Hod97, Ch. 9]
- Definability of Types, Heirs, and Forking [Pil83, Ch. 1,2,3,4]
- Open Mapping and Finite Equivalence Relation Theorems [Pil83, Ch. 4]
- Ranks [Pil83, Ch. 6]
- Indiscernibles [Pil83, Ch. 7]
- Somewhat Saturated Prime Models [Pil83, Ch. 8]
- Morley's Theorem [Hod97, Pil83]

3 Geometric Stability Theory

- Imaginary Elements and Elimination of Imaginaries [Pil96, Ch. 1]
- Canonical Parameters and Canonical Base [Pil96, Ch. 1]
- Orthogonality [Pil96, Ch. 1, Ch. 2]

4 Groups and Fields of Finite Morley Rank

- Definable Subgroups and Connected Components [BN94, Ch. 5]
- Macintyre's Theorem [BN94, Sec. 8.1]
- Zilber Indecomposability Theorem [BN94, Ch. 5]
- Zilber's Definable Field Theorem [BN94, Sec. 9.1]
- Finite Dimensionality [Las98]

5 Algebraic Geometry

- Construction of Affine and Projective Schemes [Har77, II §2]
- Construction of a Sheaf Associated to a Module [Har77, II §5]
- Twisting Sheaf of Serre [Har77, II §5]
- Vanishing of Cohomology for Flasque Sheaves [Har77, III §2]
- Vanishing Theorem of Grothendieck [Har77, III §2]
- Vanishing of Noetherian Affine Cohomology [Har77, III §2]
- Computations with Cech Cohomology [Har77, III §4]
- Equivalence of Cech and Normal Cohomology [Har77, III §4]
- Cohomology of Projective Space [Har77, III §5]

References

[BN94] Alexandre Borovik and Ali Nesin. *Groups of Finite Morley Rank*. The Clarendon Press Oxford University Press, New York, 1994. Oxford Science Publications.

[CK73] C. C. Chang and H. J. Keisler. *Model theory*. North-Holland Publishing Co., Amsterdam, 1973. Studies in Logic and the Foundations of Mathematics, Vol. 73.

[Har77] Robin Hartshorne. *Algebraic geometry*. Springer-Verlag, New York, 1977. Graduate Texts in Mathematics, No. 52.

[Hod97] Wilfrid Hodges. *A Shorter Model Theory*. Cambridge University Press, Cambridge, 1997.

[Las98] Daniel Lascar. Omega-stable groups. In *Model theory and algebraic geometry*, pages 45–59. Springer, Berlin, 1998.

[MMP96] D. Marker, M. Messmer, and A. Pillay. *Model theory of fields.* Springer-Verlag, Berlin, 1996.

[Pil83] Anand Pillay. *An Introduction to Stability Theory.* The Clarendon Press Oxford University Press, New York, 1983.

[Pil96] Anand Pillay. *Geometric Stability Theory.* The Clarendon Press Oxford University Press, New York, 1996. Oxford Science Publications.