

Model structures on categories

Lecture 6: References, Examples, Problems

Pu Zhang Shanghai Jiao Tong University

Anhui University 2025-09-13

On model structures

D. Quillen, Homotopical algebra, LNM 43, Springer, 1967.

D. Quillen, Rational Homotopy Theory, Ann. Math. 90(2)(1969), 205-295.

M. Hovey, Model categories, Math. Surveys and Monographs 63, AMS., 1999.

On exact model structures

M. Hovey, Cotorsion pairs, model category structures, and representation theory, Math. Z. 241(3)(2002), 553-592.

J. Gillespie, Abelian model category theory, Cam. Stud. Adv.Math.215, 2025.

Z. W. Li, Model structures on arbitrary Frobenius categories, Czechoslovak Math. J. 67(142)(2017), 329-337.

On weak projective model structures

A. Beligiannis, I. Reiten, Homological and homotopical aspects of torsion theories, Mem. Amer. Math. Soc. 188(883)(2007).

J. Cui, X.S. Lu, P. Zhang, Model structure from one hereditary complete cotorsion pair, J. Pure Applied Algebra 229(2025) 107958.

References

On localization of categories

P. Gabriel and M. Zisman, Calculus of fractions and homotopy theory, Ergebnisse der Mathematik und ihrer Grenzgebiete, Band 35, Springer-Verlag New York, Inc., New York, 1967.

H. Krause, Homological Theory of Representations, Cambridge Studies in Advanced Math. 195, Cambridge University Press, Cambridge, 2022.

On exact categories and Frobenius categories

D. Quillen, Higher algebraic K -theory I, In: Lecture Notes in Math. 341, 85-147, Springer-Verlag, 1973.

B. Keller, Chain complexes and stable categories, Manuscripta Math. 67(4)(1990), 379-417.

X. W. Chen, Three results on Frobenius categories, Math. Z. 270(1-2)(2012), 43-58.

References

On derived categories and triangulated categories

J. L. Verdier, Catégories dérivées, état 0 in SGA $4\frac{1}{2}$ //Lectures Notes in Math. 569, 262-311, Berlin: Springer-Verlag, 1977.

D. Happel, Triangulated categories in the representation theory of finite dimensional algebras, LMS Lecture Note Ser. 119, Cambridge Univ. Press, 1988.

S.Koenig, A. Zimmermann, Derived equivalences for group algebras, with contributions by B. Keller, M. Linckelmann, J. Rickard, R. Rouquier, LNM 1685, Springer 1998.

A. Neeman, Triangulated categories, Annals of Math. Studies 148, Princeton Univ. Press, Princeton, NJ, 2001.

References

On Gorenstein-projective modules

M. Auslander, M. Bridger, Stable module theory, Mem. Amer. Math. Soc. 94., Amer. Math. Soc., Providence, R.I., 1969.

E. E. Enochs, O. M. G. Jenda, Relative homological algebra, De Gruyter Exp. Math. 30. Walter De Gruyter Co., 2000.

L. W. Christensen, Gorenstein Dimensions, Lecture Notes in Math. 1747, Springer-Verlag, 2000.

C. M. Ringel, P. Zhang, Gorenstein-projective and semi-Gorenstein-projective modules, Algebra & Number Theory 14-1(2020), 1 - 36.

On Gorenstein-projective modules and singularity categories

R.-O. Buchweitz, Maximal Cohen-Macaulay modules and Tate cohomology over Gorenstein rings, Unpublished manuscript, Hamburg (1987).

A. Beligiannis, Cohen-Macaulay modules, (co)torsion pairs and virtually Gorenstein algebras, J. Algebra 288(1)(2005), 137 - 211.

章璞, 三角范畴与导出范畴, 科学出版社, 2015.

References

Connections with AI

P. Arndt, K. Kapulkin, Homotopy-Theoretic Models of Type Theory, Typed lambda calculi and applications, 45 – 60. Lecture Notes in Comput. Sci., 6690, Springer, Heidelberg, 2011.

S. Awodey, M.A. Warren, Homotopy-theoretic models of identity types. Math. Proc. Camb. Phil. Soc. 146 (2009), 45–55.

P. L. Lumsdaine, M. Shulman, Semantics of higher inductive types, Math. Proc. Camb. Phil. Soc. 169 (1) (2020), 159–208.

D. Gepner, J. Kock, Univalence in locally cartesian closed ∞ -categories, Forum Math. 29(3)(2017), 617–652.

M. Shulman, Univalence for inverse diagrams and homotopy canonicity, Math. Struct. in Comp. Science (2015), vol. 25, pp. 1203–1277.

References on Independence Problem on the total reflexivity

L. L. Avramov, A. Martsinkovsky, Absolute, relative, and Tate cohomology of modules of finite Gorenstein dimension, Proc. London Math. Soc. 85(3)(2002), 393-440.

D. A. Jorgensen, L. M. Şega, Independence of the total reflexivity conditions for modules, Algebras and Representation Theory 9(2)(2006), 217-226.

References on Gorenstein-projective modules and model structures on Morita rings

H. Bass, The Morita Theorems, Mimeographed Notes. University of Oregon, 1962.

N. Gao, C. Psaroudakis, Gorenstein homological aspects of monomorphism categories via Morita rings, *Algebr. Represent. Theory* 20(2)(2017), 487-529.

J. Cui, S. Rong, P. Zhang, Cotorsion pairs and model structures on Morita rings, *J. Algebra* 661(2025), 1-81.

Problems, more examples

On the blackboard.