A ROUGH GUIDE TO THE LITERATURE ON $\mathbb{A}^1$ HOMOTOPY — VERSION 1.70

INTRODUCTION

I hope to grow this document over time, so a revision number is maintained in the title. The document is in two parts: a bibliography (self explanatory) and a sequence of short paragraphs explaining the reason for inclusion of each bibliographic item. Certain **key terms** are highlighted in bold & colour for the convenience of the reader.

1. SITES & SHEAVES

The original reference for the notion of a **sheaf**, in this sense, is [AGV72]. The book [MLM92] is very readable and an excellent reference as well. The mammoth resource [de 17] is excellent on this topic as it is on many others we will encounter. For the category theory that we assume, the resource [Lan98] is the definitive reference.

2. THE NISNEVICH TOPOLOGY

Our reference for the algebraic geometry is [Har77] or [Vak15]. For the notion of an **étale map**, one may consult [de 16] or (the original) EGA IV: [Gro66]. The book [Mil80] is excellent, and in the case of varieties (which is what we really care about anyway), the notes [Mil98] are recommended.

The **Nisnevich topology** is due to [Nis89].

3. MODEL CATEGORIES

For generalities on **model categories and their localizations**, one should consider [Hir03] and [Hov99] for reference, For motivation and understanding, [BK72] and the informative [Sul74]. Some technical details not handled elsewhere are in [Bar10].

4. UNSTABLE THEORY

The original source for **local homotopy** is [Jar87]. There is also a letter of Joyal [Joy83], but it is hard to come by. Nowadays, one consults [JSS15].

For the **$\mathbb{A}^1$ homotopy theory** in particular, one must consult [MV99]. Alternate constructions are given by [Bla01], [Isa05]; for the latter one should also consult [DHI04] and [Dug01].

5. STABLE THEORY

A gentle introduction to **stable $\mathbb{A}^1$ homotopy** may be found in [VRO07]. A good account of motivic spectra and symmetric spectra can be found in [Jar00b], [Jar00a]; and another fine account is in [Hov01].

REFERENCES

[AGV72] M. Artin, A. Grothendieck, and J. L. Verdier, editors. *Théorie Des Topos et Cohomologie Étale Des Schémas. Tome 1: Théorie Des Topos*. Lecture Notes in Mathematics, Vol. 269. Springer-Verlag, Berlin, 1972. Séminaire de Géométrie Algébrique du Bois-Marie 1963–1964 (SGA 4), Dirigé par M. Artin, A. Grothendieck, et J. L. Verdier. Avec la collaboration de N. Bourbaki, P. Deligne et B. Saint-Donat.

[Bar10] Clark Barwick. On left and right model categories and left and right Bousfield localizations. *Homology Homotopy Appl.*, 12(2):245–320, 2010.

[BK72] A. K. Bousfield and D. M. Kan. *Homotopy Limits, Completions and Localizations*. Lecture Notes in Mathematics, Vol. 304. Springer-Verlag, Berlin, 1972.

[Bla01] Benjamin A. Blander. Local projective model structures on simplicial presheaves. *K-Theory*, 24(3):283–301, 2001.

[de 16] A. J. de Jong. Stacks Project — Chapter 36: More on Morphisms. `http://stacks.math.columbia.edu/chapter/36`, 2016. Tag 02GX.

[de 17] A. J. de Jong. Stacks Project. `http://stacks.math.columbia.edu/`, January 2017.

[DHI04] Daniel Dugger, Sharon Hollander, and Daniel C. Isaksen. Hypercovers and simplicial presheaves. *Mathematical Proceedings of the Cambridge Philosophical Society*, 136(1):9–51, 2004.

[Dug01] Daniel Dugger. Universal Homotopy Theories. *Advances in Mathematics*, 164(1):144–176, December 2001.

[Gro66] A. Grothendieck. Éléments de géométrie algébrique. IV. Étude locale des schémas et des morphismes de schémas. III. *Institut des Hautes Études Scientifiques. Publications Mathématiques*, (28):255, 1966.

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

[Hir03] Philip S Hirschhorn. *Model Categories and Their Localizations*. Number v. 99 in Mathematical surveys and monographs. American Mathematical Society, Providence, RI, 2003.

[Hov99] Mark Hovey. *Model Categories*, volume 63 of *Mathematical Surveys and Monographs*. American Mathematical Society, Providence, RI, 1999.

[Hov01] Mark Hovey. Spectra and symmetric spectra in general model categories. *Journal of Pure and Applied Algebra*, 165(1):63–127, 2001.

[Isa05] Daniel C. Isaksen. Flasque model structures for simplicial presheaves. *K-Theory*, 36(3-4):371–395 (2006), 2005.

[Jar87] J. F. Jardine. Simplicial presheaves. *Journal of Pure and Applied Algebra*, 47(1):35–87, 1987.

[Jar00a] J. F. Jardine. Motivic symmetric spectra. *Documenta Mathematica*, 5:445–553 (electronic), 2000.

[Jar00b] J. F. Jardine. Presheaves of symmetric spectra. *Journal of Pure and Applied Algebra*, 150(2):137–154, 2000.

[Joy83] André Joyal. Letter to {G}rothendieck, 1983.

[JSS15] John F. Jardine, SpringerLink (Online service), and SpringerLINK ebooks - Mathematics and Statistics. *Local Homotopy Theory*. Springer Monographs in Mathematics. Springer New York, DE, 2015.

[Lan98] S. Mac Lane. *Categories for the Working Mathematician*. Springer, 1998.

[Mil80] James S Milne. *Étale Cohomology*, volume 33 of *Princeton Mathematical Series*. Princeton University Press, Princeton, N.J., 1980.

[Mil98] J. S. Milne. Lectures on Étale Cohomology. `http://www.jmilne.org/math/CourseNotes/lec.html`, 1998.

[MLM92] Saunders Mac Lane and Ieke Moerdijk. *Sheaves in Geometry and Logic*. Universitext. Springer-Verlag, January 1992.

[MV99] Fabien Morel and Vladimir Voevodsky. A1-homotopy theory of schemes. *Publications Mathématiques de L'Institut des Hautes Scientifiques*, 90(1):45 – 143, December 1999.

[Nis89] Ye. A. Nisnevich. The completely decomposed topology on schemes and associated descent spectral sequences in algebraic K-theory. In *Algebraic K-Theory: Connections with Geometry and Topology (Lake Louise, AB, 1987)*, volume 279 of *NATO Adv. Sci. Inst. Ser. C Math. Phys. Sci.*, pages 241–342. Kluwer Acad. Publ., Dordrecht, 1989.

[Sul74] Dennis Sullivan. Genetics of Homotopy Theory and the Adams Conjecture. *Annals of Mathematics*, 100(1):1–79, July 1974.

[Vak15] Ravi Vakil. The Rising Sea: Foundations Of Algebraic Geometry Notes. December 2015.

[VRO07] Vladimir Voevodsky, Oliver Röndigs, and Paul Arne Østv\aer. Voevodsky's Nordfjordeid lectures: Motivic homotopy theory. In *Motivic Homotopy Theory*, Universitext, pages 147–221. Springer, Berlin, 2007.