READING SEMINAR ON STABLE ∞-CATEGORIES

THE UNIVERSITY OF WESTERN ONTARIO

We will work through Chapter 1 of Lurie's "Higher Algebra". The entire book is available for download in pdf format from the website

http://www.math.harvard.edu/~lurie/papers/HA.pdf

(1) **Introduction to spectra** (Dan Christensen). This talk is a general introduction to spectra and the monoidal model category of spectra, meant to bring everyone up to speed.
Date: May 3rd, 2017.

(2) **Stable ∞-categories** (Luis Scoccola). This talk should present the material of §§1.1.1–1.1.2. Specifically, define stable ∞-categories and give a characterization of Proposition 1.1.3.4. Then sketch the proof that if $\mathcal{C}$ is stable, then $\mathrm{Ho}\mathcal{C}$ is triangulated (Theorem 1.1.2.15).
Date: May 10th, 2017.

(3) **Stabilization and its universal property** (James Richardson). Follow the presentation of §1.4.2 and §1.4.4. Specific results covered should include: Proposition 1.4.2.16 (the stabilization is. . . stable), Proposition 1.4.2.11 and Corollary 1.4.2.27 (characterization of stable ∞-categories), Corollary 1.4.4.5 (universal property of stabilization).
Date: May 17th, 2017.

(4) **Dold–Kan correspondence** (Marco Vergura). One can follow the presentation of §§1.2.3–1.2.4, although for the classical part other sources may be useful as well. Start by reviewing the classical Dold–Kan correspondence and then sketch the proof of Theorem 1.2.4.1, giving its ∞-categorical version.
Date: May 24th, 2017.

(5) **Stable ∞-categories induced by additive categories** (Aji Dhillon and Dinesh Valluri). This talk should follow §1.3.1 and the first part of §1.3.2 (without t-structures). Construct the nerve of a dg-category in two ways: directly via Construction 1.3.1.6 and via the homotopy coherent nerve functor (Construction 1.3.1.13). Show that the two constructions are equivalent (Proposition 1.3.1.17). Finally, construct the derived ∞-category $\mathcal{D}^-(\mathcal{A})$ of an abelian category (§1.3.2), but without discussing its canonical t-structure.
Date: May 26th, 2017.

(6) **t-structures** (Pál Zsámboki). Define t-structures (following §1.2.1) and focus on the examples: the canonical t-structure on the derived ∞-category $\mathcal{D}^-(\mathcal{A})$ of an abelian category (second part of §1.3.2) and on spectra (Proposition 1.4.3.6).
Date: May 31st, 2017.

Date: May 2017.