Topology Seminar

Emmanuel Dror Farjoun

of Hebrew University will be speaking on

Adjoint descent for infinity categories

on September 26 at 4:30 in
MIT Room 2-131

It is common practice to simplify an object of a given “complicated” category $X \in C$ via the application of collection of functors $F_\alpha : C \to C_\alpha$. One then hopes to reconstruct X via a (co-)limit from $(F_\alpha X)_{\alpha \in I}$. Examples include restricting a bundle over a space X to subspaces X_α, extending a ring of scalars, truncating a homotopy type X via the Postnikov tower $P_n X$, or forming polynomial approximations of a functor F.

Here the question of conjugates arises: For a given X, find (the groupoid of) all objects W in the category C with the same given values $F_\alpha W \cong F_\alpha X$.

It turns out that under adjoint conditions one can recover the category C from the diagram of categories C_α, this leads to standard expressions for conjugates.

This approach puts on the same footing the classification of forms via Galois cohomology, the Mislin genus and Postnikov conjugates, the Taylor tower for functors and vectors bundles as well as usual descent to sub-schemes.

For example, the equivalence of ∞-categories $Top \cong \lim_n Top_n$, where Top_n is the category of n-truncated spaces is an immediate consequence. (Work by Assaf Horev and Lior Yanovski, HU, Jerusalem.)