

Linear algebra and unification of geometries in all scales

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Abstract: I will present a framework inspired by concepts from linear algebra that allows for a unified exposition of the following three basic geometries:

- a. topology,
- b. uniform category (i.e. small scale geometry),
- c. large scale geometry.

As an application, I will show a unified version of the Dimension-Raising Theorem and a simple proof of it. The famous Dimension-Raising Theorem of Hurewicz states that if $f : X \rightarrow Y$ is an n -to-1 map (that means point-inverses of points in Y under f contain at most n points) of compact spaces, then the dimension of Y is at most $\dim(X) + n - 1$. Large scale version of that theorem was proved in a series of papers by Miyata-Virk, Dydak-Virk, and Austin-Virk. I will show that Large Scale Dimension-Raising Theorem follows from the Topological Dimension-Raising Theorem.