Logic Seminar: Proof Interpretations I

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This is the first of a series of talks on proof interpretations, following the book *U, Kohlenbach, "Applied Proof Theory. Proof Interpretations and their Use in Mathematics"*.

We will introduce the logic in which we are going to work, Extensional Heyting Arithmetic in all finite types ($\mathbf{E}-\mathbf{HA}^{\omega}$, for short), which is a many-sorted version of Intuitionistic logic (a sort for each finite type), extended with Heyting arithmetic. We will start our study of proof interpretation with *Modified realizability*. This notion originates from Georg Kreisel's works in 1959, in which he intended to give a consistency proof for the system Heyting Arithmetic in all finite types ($\mathbf{HA}^{\omega}$, for short), and accordingly, he defined a straightforward extension of Kleene's realizability to this typed system.