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Victor Vinnikov* (vinnikov@math.bgu.ac.il), Department of Mathematics, Ben Gurion University of the Negev, P.O.B. 653, 8410501 Beer Sheva, Israel. *Higher order noncommutative functions and the universal skew field of fractions of a tensor product of free algebras.*

Higher order free noncommutative functions relate to usual free noncommutative functions much like usual commutative functions of several variables relate to functions of a single variable. They appear naturally in noncommutative function theory as the range of the noncommutative difference-differential operator. In this talk, I will first review higher order noncommutative functions and some of their properties. I will then show how these ideas can be used in the context of noncommutative rational functions to construct the universal skew field of fractions, in the sense of P.M. Cohn, of a tensor product of free algebras (which is not a fir nor even a Sylvester domain). The talk is based on joint work with Dmitry Kalyuzhnyi-Verbovetskii, and with Igor Klep and Jurij Volcic. (Received September 22, 2015)