

STARLIKENESS OF NORMALIZED BESSEL FUNCTIONS AND THEIR DERIVATIVES

PROF. ARPAD BARICZ

ABSTRACT

In this talk our aim is to present some necessary and sufficient conditions for the starlikeness of Bessel functions of the first kind and their derivatives of the first, second and third order by using a result of Shah and Trimble about transcendental entire functions with univalent derivatives and some Mittag-Leffler expansions for the derivatives of Bessel functions of the first kind, as well as some results on the zeros of these functions. Our aim is also to present necessary and sufficient conditions for the close-to-convexity of some special combinations of Bessel functions of the first kind by using some newly discovered Mittag-Leffler expansions for Bessel functions of the first kind; as well as a necessary and sufficient condition for the close-to-convexity of a cross product of Bessel and modified Bessel functions of the first kind, and their derivatives by using the newly discovered power series and infinite product representation of this cross-product, and a slightly modified version of a result of Lorch on the monotonicity of the zeros of the cross product with respect to the order.