

On the Ore extension ring of differential time-varying delay operators

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In this talk, I will present an algebraic method to study linear differential time-varying delay (DTVD) systems. The goal is to have an effective construction of the ring of DTVD operators as an Ore extension, thanks to the concept of skew polynomial rings. Some algebraic properties of the DTVD operators ring will be shown, such as its Noetherianity, its homological and Krull dimensions and the existence of Gröbner bases, all given in terms of the time-varying delay function. The algebraic analysis framework for linear systems theory allows us to study linear DTVD systems and important properties, such as the controllability and flatness, using module theory, homological algebra and constructive algebra.