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Todd Kapitula* (tmk5@calvin.edu), Department of Mathematics and Statistics, Calvin College, Grand Rapids, MI 49546. *Instability index theorems for polynomial pencils.*

In many physical problems the descriptive mathematical model is of such a form that the stability of an underlying wave is determined by finding the spectrum of a polynomial pencil, i.e., a polynomial in the spectral parameter whose coefficients are operators. In this talk I will describe recent work in which the number of unstable eigenvalues, i.e., those zeros of the polynomial with positive real part, can be determined through a spectral analysis of the coefficient operators. (Received September 04, 2012)