Title:

From Levinson and Coppel to today:
A survey of asymptotic integration of linear differential systems

Abstract:

The asymptotic analysis of solutions of differential equations, initiated by Poincaré in the late 19th century, has grown into an important field with many different methods.

This talk concerns one such method called "asymptotic integration," which seeks to identify the asymptotic behavior of solutions of linear systems $x' = A(t)x$ by answering the question: For which $A(t)$ does there exist a fundamental matrix $X(t)$ of the form

$$X(t) = P(t)\ [I + \mathrm{o}(1)] \exp\left[\int^t \hat{A}(s)\,ds\right] \qquad \text{as } t \to \infty$$

where $P(t)$, $\exp\left[\int^t \hat{A}(s)\,ds\right]$ *explicitly computable* (for example, $\hat{A}(s)$ diagonal), and "$\hat{A}(t)$ close to $A(t)$"?

The foundation of this theory was laid in the mid 19th century and has attracted ongoing interest and research contributions ever since. We give an introduction to and overview of this theory, including commonly used techniques and some major results.

If time permits, we talk briefly about similar results for systems of linear difference equations.

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