ment to Yudovich's book is D. D. Joseph's treatise, *Stability of Fluid Motion*, Springer-Verlag, 1976.

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BULLETIN (New Series) OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 23, Number 2, October 1990

0273-0979/90 $1.00 + $.25 per page

J Contractive matrix functions, reproducing kernel Hilbert spaces and interpolation, by Harry Dym. American Mathematical Society, Providence, R. I., 147 pp., $22.00. ISBN-0-8218-0722-6

The primary focus of this book is a collection of interpolation problems for matrix-valued functions. The classical versions of these problems for scalar functions are associated with the names of Nevanlinna–Pick, Caratheodory–Fejer, and Nehari. The Nevanlinna–Pick problem is to find a function analytic on the unit disk mapping the disk into itself which takes prescribed values at a finite number of prescribed points in the unit disk. In the Caratheodory-Fejer problem one seeks an analytic function mapping the unit disk into the right half plane with prescribed values for the first few Taylor coefficients at the origin. In the Nehari problem one seeks a function on the unit circle with supremum norm over the unit circle at most one which has its Fourier coefficients with negative indices equal to a prescribed sequence of numbers. The work of Nevanlinna, Pick, Caratheodory, and Fejer was in the early part of this century while that of Nehari was somewhat later. The solution to all these problems splits into two parts. First, existence of a solution is equivalent to the positive semidefiniteness of a certain matrix or the contractivity of a certain operator built from the data of the problem. Secondly, when this condition holds, either the solution is unique or there are infinitely many solutions which can be described as the image of some linear fractional map applied to the set of analytic functions mapping the unit disk into its closure.

Interest in the matrix-valued versions of all these problems has become particularly intense in the last ten to fifteen years, in large part due to the advent of a new approach in engineering, called H-infinity control theory. In control theory, matrix-valued functions arise as transfer functions of physical systems. Input–output