XII. FREQUENCY MODULATION

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RESEARCH OBJECTIVES

It is becoming widely appreciated that the known limitations of FM systems are mainly limitations of the conventional FM signal-processing techniques. In numerous applications, FM systems must operate under severely adverse conditions of transmission and reception, and extensive basic research is still needed to alleviate the difficulties. We have been concerned with problems of reception under conditions of high-level disturbances that arise from the presence of random noise under threshold or below threshold conditions, from the presence of other signals of arbitrary amplitudes relative to the desired signal within the receiver passband, and from impulse noise. Several new signal-processing techniques are being developed to meet the requirements of each of these situations.

Of interest in these studies are certain fundamental questions that relate to the characterization and the properties of time-variant systems, especially in the presence of variable-frequency excitations. Detailed studies of the response characteristics of certain simple filters to various types of variable-frequency excitation have revealed that some of these characteristics could be used in the solution of several communication problems in which high-accuracy measurements are imperative.

We are also concerned with a critical evaluation of a new system of amplitude-discrimination FM multiplexing, realization of which has been made possible by the development of some of our new FM signal-processing techniques.

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