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## [54] MODEL IDENTIFICATION AND CHARACTERIZATION OF ERROR STRUCTURES IN SIGNAL PROCESSING

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[58] Field of Search ..... 364/554, 572, 364/724.19; 375/340, 345, 349, 350; 342/91, 92; 367/135

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### [57] ABSTRACT

A method for finding a probability density function (PDF) and its statistical moments for an arbitrary exponential function of the form  $g(x)=\alpha x^m e^{-\beta x^n}$ ,  $0 < x < \infty$ , where  $\alpha, \beta, n > 0$ ,  $m > -1$  are real constants in one-dimensional distributions and  $g(x_1, x_2, \dots, x_n)$  in the hyperplane. Non-linear regression analyses are performed on the data distribution and a root-mean-square (RMS) is calculated and recorded for each solution set until convergence. The basis function is reconstructed from the estimates in the final solution set and a PDF is obtained. The moment generating function (MGF), which characterizes any statistical moment of the distribution, is obtained using a novel function derived by the inventors and the mean and variance are obtained in standard fashion. Simple hypotheses about the behavior of such functional forms may be tested statistically once the empirical least squares methods have identified an applicable model derived from actual measurements.

13 Claims, 2 Drawing Sheets

