

Article Abstract

Title:	Signal-to-Noise ratio and design complexity based on Unified Loss Function – LTB case with Finite Target
Author(s):	N.K. Sharma ¹ , E.A. Cudney ^{1*}
Address(es):	^{1*} Department of Engineering Management and Systems Engineering, Missouri University of Science and Technology Rolla, MO, USA *Corresponding Author: e-mail: cudney@mst.edu, Tel 573-3417931, Fax. 573-3416567
Journal:	<i>International Journal of Engineering, Science and Technology</i> , Vol. 3, No. 7, 2011, pp. 15-24.
Abstract:	Taguchi's quality loss function for larger-the-better performance characteristics uses a reciprocal transformation to compute quality loss. This paper suggests that reciprocal transformation unnecessarily complicates and may distort results. Examples of this distortion include the signal-to-noise ratio based on mean squared deviation and the signal-to-noise ratio based on complexity. The concept of complexity is an important element of axiomatic design and axiomatic quality. This paper shows that a simple linear transformation as used in the unified loss function can give an appropriate and comparable signal-to-noise ratio based on mean squared deviation and signal-to-noise ratio based on complexity for larger-the-better characteristics. Mathematical derivations are given and two examples are discussed to demonstrate the proposed methodology.
Keywords:	Design Complexity, Axiomatic Design, Signal-to-Noise Ratio, Robust Design, Quality Loss Function.