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The Process Optimization of Non-additive Multi-Quality Characteristics Associated with Cost Model

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Abstract—An approach has been proposed in this study to achieve this project. In this study, three-quality characteristics: (1) times of signal error, (2) CPU utilization and (3) occupation of random access memory (RAM) of digital video recorder system (DVRS) for stability (or shut-down protection) will be executed and tested by static and dynamic digital-digital S/N ratios in Taguchi Method. Besides, a generalized form of grey relational grade derived by a utility function will be used to determine the optimal setting of DVRS configuration and an alternative form of grey relational grade derived by a quadratic loss function will be used to determine the weight of multi-quality characteristics. Finally, we take the quality levels of sub-units (or control factors) of DVRS, weights of sub-units, costs of sub-units and quality weights of characteristics into consideration to develop a hardware quality and cost optimization model. According to the optimized model, the optimal configure of DVRS can be determined under different budgetary constrains.

Keywords—Digital video recorder system, Taguchi Method, S/N ratio, utility function, grey relational grade, quadratic loss function

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