



Invited Special Talk

Title: Parameter Deployment and Manipulation: an overarching approach for identifying and solving contradictions

Speaker: Professor D. Daniel Sheu

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Speaker Biography:

Dongliang Daniel Sheu is a professor emeritus at National Tsing Hua University in Taiwan. He has 27 years of academic experience and nine years of industrial experience in electronic manufacturing. Daniel holds a B.S.M.E. degree from National Taiwan University, an M.S.M.E. degree from State University of New York at Buffalo, a Ph.D. in Engineering from UCLA, and an MBA degree from Northwestern University. His areas of expertise include Intelligent Innovation Methods including TRIZ, Patent Technical Analysis, Innovation Management, Design and Manufacturing Management.

Abstract

This talk shares a unified theory and the set of methods to solve physical and technical contradictions based on the novel ideas of Parameter Deployment, Parameter Manipulation, and Parameter Transfer developed by the speaker's research team. The Parameter Deployment is to deploy the constituent parameters for contradictory objectives and conflicting parameters. Parameter Manipulation includes Parameter Separation and Parameter Transfer. Parameter Separation is to separate two contradictory demands, either at the objective level or at the conflicting parameter level, to solve the contradiction. Parameter Transfer is to transfer one or two of the contradictory demands to one or two seeming unrelated parameter(s) from outside of the system so that the contradiction can be eliminated.

$17+10(n-1)$ modes (Strategies) for solving a physical contradiction are thus developed. Where n is the number of contradicting parameters identified by the parameter deployment process. All existing separation principles and the by-passing/satisfying methods fall into 4 of the 17+ modes of problem-solving methods developed. While all other existing modes of solving physical contradictions are independent and unrelated at best, this new set of 17+ problem-solving modes are logically related and comprehensively constituting a unified set of methods to solve contradictions. The algorithm of solving physical contradictions using parameter manipulation methods was tested on 100 examples. The results showed that the number of solution ideas generated by the parameter manipulation methods is on average 4.8 times the number of all other existing solution methods combined and all solution ideas from other methods can also be identified by the parameter manipulation methods.