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Beyond Classic Program Evaluation and Review Technique: A Generalized Model for Subjective Distributions with Flexible Variance

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Abstract : The Program Evaluation and Review Technique (PERT) is widely used for project management, but it struggles with subjective distributions, particularly due to its assumptions of constant variance and light tails. To overcome these limitations, we propose the Generalized PERT (G-PERT) model, which enhances PERT by incorporating variability in three-point subjective estimates. Our methodology extends the original PERT model to cover the full range of unimodal beta distributions, enabling the model to handle thick-tailed distributions and offering formulas for computing mean and variance. This maintains the simplicity of PERT while providing a more accurate depiction of uncertainty. Our empirical analysis demonstrates that the G-PERT model significantly improves performance, particularly when dealing with heavy-tail subjective distributions. In comparative assessments with alternative models such as triangular and lognormal distributions, G-PERT shows superior accuracy and flexibility. These results suggest that G-PERT offers a more robust solution for project estimation while still retaining the user-friendliness of the classic PERT approach.

Keywords : PERT, subjective distribution, project management, flexible variance
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