Explicit formulas for the variance of discounted life-cycle cost

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Abstract

In life-cycle costing analyses, optimal design is usually achieved by minimising the expected value of the discounted costs. As well as the expected value, the corresponding variance may be useful for estimating, for example, the uncertainty bounds of the calculated discounted costs. However, general explicit formulas for calculating the variance of the discounted costs over an unbounded time horizon are not yet available. In this paper, explicit formulas for this variance are presented. They can be easily implemented in software to optimise structural design and maintenance management. The use of the mathematical results is illustrated with some examples.

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