

APPLICATION SOFTWARE FOR RELIABILITY ESTIMATION AND RISK EVALUATION

Problem Description

The technical project processing is a rule at the end of the solution selection. The criteria for evaluation can be utility, economic, ecology, strategy in-groups, etc. The quantitative evaluations of the single construction parts are available from the project processing. Aggregated value which evaluates complete project is not always available. The designer has neither static and dynamic values, nor the one describing the risks of the proposed solution available.

The question of the engineering (technical) reliability conception [4], [5] and economic view [6], [7], [8] concerning risks, uncertainty, indeterminateness, reliability differs both in conception and methods. The connection is not directly portable from the view of the theory availability, but as regards of losing information when establishing aggregates for final economical information. The technical disciplines have a more definite way to access data. They solve exercises with explicitly defined inputs; create solutions without links to higher aggregate parameters.

Status Quo

The modern project documentation process is being practiced in the environment of efficient CAD application systems. Its architectural and technical outputs are on the high level. Economical resumes are on the level of the quantitative parameters and its financial analysis. Application tool evaluating the quality of respective construction parts and their risks are not processed with for the concrete solution above.

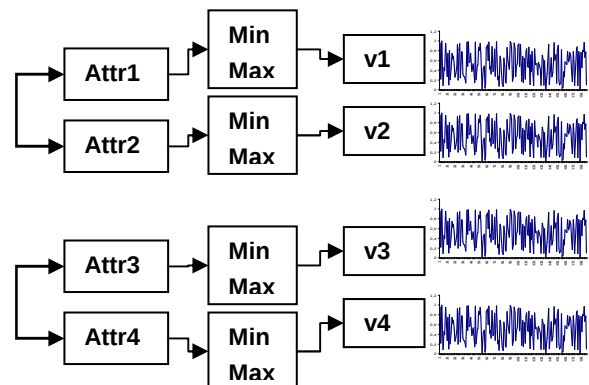
The realization software [3] sufficiently provides information about terms and balance-sheet of sources. Currently, it is not possible to obtain reliable values of the terms and balance-sheet of sources from risk calculation otherwise then using the Monte Carlo method.

Application Software for Risk Evaluation

In the risk and reliability evaluation process 2 project phases are recognized:

1. Project solution
2. Realization solution

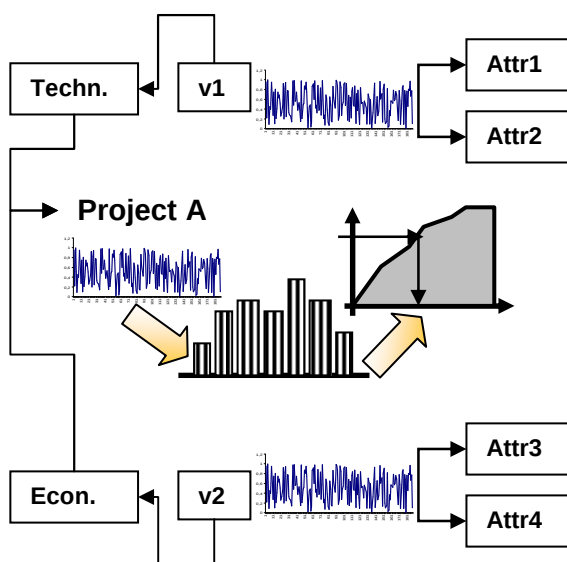
The project solving suggests project decomposition into individual constructional parts in required details. The realization solution divides the project into activities and defines links among these activities. Every attribute (constructional element in project, activity in a progress chart) is complemented by a risk interval, in which will the actual value in realization process appear. In the frame of this interval, possible disturbances by technical processing or final realization process are simulated (see *Attr_i* in giant. 1).



Picture No. 1: Risk value addition to single project element (constructional parts, activities in a progress chart).

Every evaluation level has its evaluation weight (v_i). By aggregating a lower simulation level, we can get a higher evaluation level according to the scheme see Picture No. 2.

After aggregation all lower levels we obtain final evaluation of the complete project including statistical and especially value-reliable data (e. g. reliable termination of realization processes).



Picture No. 2: Aggregation of the lower simulation levels from the Picture No. 1.

Except the project risk investigation, it is suitable to also create parameterization studies. The parameterization of changes engaged into exercise presents an area in which the solving can/should be carried out. The question of reliability of given questions has a key meaning. From time perspective, the future data are negatively influenced:

- probable occurrence of changes in the primary propositions of the project,
- risks,
- uncertainty,
- indeterminateness.

Their sources can in the initial stage be calculated and evaluated. From this point of view, reliability questions mean important information. In technical disciplines, reliability definition [4], [5] is generally accepted as follows:

The reliability equals the probability that system fulfills its function in the time defined and given specified conditions.

In the economic disciplines, we mostly are working with risk evaluation, to which the preconditions of the exercise economic setting are exposed.

We can write $R(t) = \sum P_{fi} C(t)$, where P_{fi} are disturbance probabilities of presumptions connected with penalty parameters $C(t)$.

Legislation

- ČSN EN 60300-1 management spolehlivosti - Část 1: Systémy managementu spolehlivosti
- ČSN EN 60300-2 management spolehlivosti - Část 2: Směrnice pro management spolehlivosti
- ČSN EN 60300-3-14 management spolehlivosti - Část 3-14: Pokyn k použití - Údržba a zajištění údržby
- ČSN EN 60300-3-2 management spolehlivosti - Část 3-2: Pokyn k použití - Sběr dat o spolehlivosti z provozu
- ČSN EN 60300-3-3 management spolehlivosti - Část 3-3: Pokyn k použití - Analýza nákladů životního cyklu

Basic literature

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