

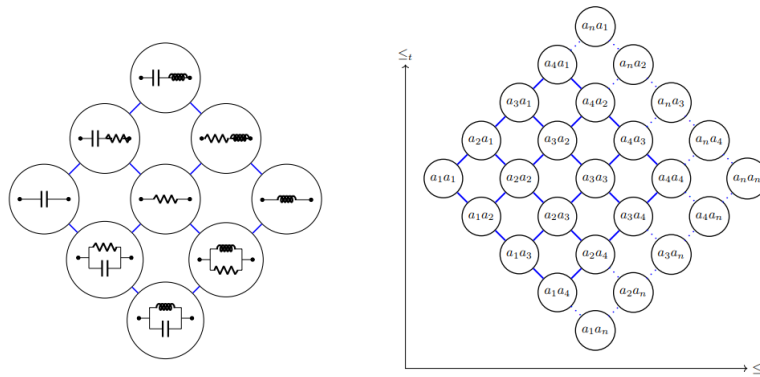
On the Relation of Multi-valued Logics and M-System Theory

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This talk will give an innovative approach to multi-valued logic using theory of M-system introduced by M. Šare in [3] which is based on theory of electric circuits.

The M-system is a quadruple $(\Gamma, <_{\Gamma}, \cdot, M_{\Gamma})$, where Γ is an finite alphabet totally ordered by relation $<_{\Gamma}$, \cdot is a binary operation of joining two words over Γ and M_{Γ} is set of *M-words* - words which consist of an even number of symbols from Γ .

Let L be a set of all two-symbol words over Γ . Then the shell of M-word is operator $q: M_{\Gamma} \rightarrow L$, $q(x) = l_x r_x$ where l_x and r_x are the first and the last symbol of the word x . In M-logic system, q is taken as valuation function and two-symbol words over Γ as truth values. In this way M-logic system becomes multi-value logical system.



It can be shown that Bool's logic, Kleen's logic and Dunn/Belnap B_4 logic correspond to two,three and four-valued M-logic. Moreover, there is an extension of shell operator which gives that 16-valued M-logic corresponds to SWEET-SIXTEEN from [2].

M - logic is easily generalized to any number of truth values and it is very natural for use in computer processing. Established M-system computer support is publicly available and will be demonstrated at the workshop.

References

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