Numerical method for determining potential coefficients matrix for multiconductor transmission line

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Consider the numerical technique for computing the matrix of potential coefficients for multiconductor electrical lines, i.e. for a system consisting of an arbitrary number of electrical conductors. The transmission line equations [1] contain the matrix of the coefficients of electrostatic induction which allows to express the charge vector through the vector of potentials in each conductor. The method for calculating the exact values of its coefficients is proposed in [2]. For this purpose it is necessary to solve n (number of conductors) Dirichlet problems with known boundary conditions. At the same time it is proposed numerical method for calculating the potential coefficients matrix, which allows to express the vector of potentials through the charge vector in each conductor. In order to obtain the elements of this matrix we obtain the problem that differs from the classical Dirichlet problem for the Laplace equation. The difference consists in replacing the Dirichlet condition by some special boundary condition, which contains integrals over the boundary of the domain from the values of the unknown function. Such problems are called problems with nonlocal boundary conditions. The existence and uniqueness of the solution of such a problem are proved in this paper.

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Mathematical modelling of the screening of musical abilities and skills

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This article is a continuation of the bachelor's thesis "*ICT Services for the Screening of Musical Abilities and Skills*". Based on the results obtained, a mathematical model is proposed. It presents a multicriteria optimization. An integrated additive criteria is defined as a superposition of local criterias derived from the special conditions determined by the decision-maker. The solutions are designed to facilitate decision-maker in the "primary" quantitative assessment of the screening of musical skils and abilities that have a great impact on the overall development of person.
Key words: musical abilities, musical skills, screening, mathematical model, multicriteria optimization, integrated additive criteria, local criteria, decision-maker, "primary" quantitative assessment, weight coefficients, method Churchman - Ackoff.

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Entropy and F-divergence construction using the Einstein sum

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The Einstein sum was defined by the formula [1]:

$$\forall x, y \in (-1,1), x \oplus y = \frac{x+y}{1+xy} \tag{1}$$

Starting from the Einstein sum and considering the real parameter $a \in (1,\infty)$, we define the function $f : [0,\infty) \to (-\infty,\infty)$ with the formula:

$$f(x) = \ln\left(\frac{x+a}{1+ax}\right) \tag{2}$$

Using the function f, the following formulas for entropy H_f and f-divergence D_f are constructed [**??**,**??**] .

$$H_f(P) = \sum_{i=1}^{n} p_i \ln\left(\frac{p_i+a}{1+ap_i}\right) \tag{3}$$

$$D_f(P||Q) = \sum_{i=1}^{n} p_i \ln\left(\frac{q_i+ap_i}{p_i+aq_i}\right) \tag{4}$$

where $P = (p_1, p_2, \ldots, p_n)$ and $Q = (q_1, p_2, \ldots, q_n)$ are two discrete probabilities distributions.

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