PATTERN RECOGNITION OR SOLVING EQUATION WITH ALL MULTINOMIAL COEFFICIENTS UNKNOWN

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The problem is as follows. There is a communication point, from where we receive data. Patterns of the pieces of data being sent over the channel are known at the receiving point. Data may be fully or partially distorted while transferring on the communication channel. Moreover, we know that a communication channel distorts signal by n-power polynomial, which has all the parameters unknown. In other words, pattern recognition task is to be solved. It is also needed to find out which parts of the received data were distorted, and whether it was fully or partially distorted.

The best and the only way to solve this task is with use of m-nonproportionalities.

If we have data patterns described as functions $W_i(t)$, where i - number of patterns, at the receiving point we will get a set of distorted values, which will be multinomial of $W_i(t)$ with unknown coefficients U(t). For etalon data recognition, contained in received signal, m-nonproportionality of U(t) on each of $W_i(t)$ is used. I.e. its identification lies in recursive calculation of nonproportionalities U(t) on first derivative of $W_i(t)$. If m-nonproportionality equals to zero the recognition of accepted data is considered to be done.

The depth of the recursive process of calculation nonproportionalities U(t) on first derivative of $W_i(t)$ is defined by a maximum possible power of the polynomial, which is used to distort signal sent from a communication point. Even though communication channel is beyond our control, knowing its properties or empirically studying them allows us to discover polynomial maximum power for calculation algorithm.

There are many real-world examples where such recognition system could be used. In nowadays computers and television-sets, which are mainly built on transistors and semiconductors, processed signal in all of the microcircuit chips is distorted like that if the signal is not strong enough. As another example of the described method use in real-life may be system of remote recognition of airplanes hull numbers, which are printed with given font and its parts may be not fully reproduced or distorted under many circumstances.

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