WHY "A" AND "THE"? WHY PLURAL? WHY ONE GOD?
AN ALGORITHMIC EXPLANATION

Why "a" and «the''? Why Plural? Formulation of the Problem. In most Slavic languages, there are no articles, no direct analogues of the English "a" and "the". As a result, when native speakers of these languages speak English, they often get confused about the articles. This confusion with articles is often a telltale sign that a paper was written by a Slavic author. To a native speaker of English, these articles may be natural, but to Slavic-language speakers, they seem to be a strange construction that unnecessarily complicates the language.

Similarly, a telltale sign of Chinese-speaking authors is a confusion between singular and plural. To native speakers of Chinese, the need to always indicate this difference probably also sounds like a strange and unnecessary complication.

However, natural languages usually do not have unnecessary features: languages evolve, and if a feature is unnecessary, it disappears with time. So why do languages have articles? why do they have plural and singular? This is what we explain in this paper.

Our Explanation. Our explanation is based on the fact that one of the main human activities is solving problems, e.g., finding an alternative that satisfies given constraints or finding an alternative which is optimal with respect to some reasonable objective functions.

It is well known that in general, no algorithm is possible that would solve all the problems; see, e.g., [6]. For example, no algorithm is possible that, given a computable function f(x) on a computable set X for which there are values x that satisfy the constraint f(x) = 0 returns one of the values. Similarly, no algorithm is possible that, given a computable function f(x) on a computable set X, return a point x from X at which the function f(x) attains its maximum.

However, interestingly, both problems become algorithmically solvable if we restrict ourselves to situations in which there is exactly one alternative: there is a general algorithm that, given a computable function f(x) on a computable set X which has a unique root, computes this root; there is an algorithm that, given a computable function f(x) on a computable set X that attains its maximum at
exactly one point $x$, returns this point $x$; see, e.g., [1-6] And if we allow exactly two roots or two optimizing points, no general algorithm is possible.

From this viewpoint, in practice, it is useful to know whether the given problem has a unique solution. This is exactly what is achieved by the plural-singular distinction, this is exactly what is achieved by the article "the" -- which explains the use of these constructions in natural languages.

**Auxiliary Explanation.** The above argument leads also to an additional explanation of why monotheistic religions are dominant (see, e.g., [7]): if there exist several gods $x$, it is not algorithmically possible to always decide which god is responsible for a given phenomenon and thus, to decide who to appeal to so that situation be improved. On the other hand, when there is a unique God, this God can be, in general, algorithmically found.

**Литература**