FRI2-A4

A Study of Causal Modeling with Time Delay for Frost Forecast Using Machine Learning from Data

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Abstract: There is a method for predicting frost occurrence in a short period of time using causal modeling with time delay. In this method, the input is an environmental factor, and there is a great potential for granulation for this environmental factor. In this study, we show that the accuracy of predicting frost occurrence can be improved by appropriately granulating the input environmental factors for each them.

SAT1-A1

How to Work? How to Study? Shall We Cram for the Exams? And How Is This Related to Life on Earth?

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Abstract: If we follow the same activity for a long time, our productivity decreases. To increase productivity, a natural idea is therefore to switch to a different activity, and then to switch back and resume the current task. On the other hand, after each switch, we need some time to get back to the original productivity. As a result, too frequent switches are also counterproductive. Natural questions are: shall we switch? if yes, when? In this paper, we use a simple model to provide approximate answers to these questions.

SAT1-A2

Why Quantum Techniques Are a Good First Approximation to Economic Phenomena, and What Next

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Abstract: Somewhat surprisingly, several formulas of quantum physics – the physics of micro-world – provide a good first approximation to many social phenomena, in particular, to many economic phenomena, phenomena which are very far from micro-physics. In this paper, we provide three possible explanations for this surprising fact. First, we show that several formulas from quantum physics actually provide a good first-approximation description for many phenomena in general, not only to the phenomena of micro-physics. Second, we show that some quantum formulas represent the fastest way to compute nonlinear dependencies and thus, naturally appear when we look for easily computable models; in this aspect, there is a very strong similarity between quantum techniques and neural networks. Third, due to numerous practical applications of micro-phenomena, many problems related to quantum equations have been solved; so, when we use quantum techniques to describe social phenomena, we can utilize the numerous existing solutions – which would not have been the case if we use other nonlinear techniques for which not many solutions are known. All this provides an explanation of why quantum techniques work reasonably well in economics. However, of course, economics is different from quantum world, quantum equations only provide a first approximation to economic situations. In this paper, we use the ideas behind our explanations to speculate on what should be the next – not-exactly-quantum – approximation to social and economic phenomena.

SAT1-A3

How the Pavement's Lifetime Depends on the Stress Level: An Explanation of the Empirical Formula

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Abstract: We show that natural invariance ideas explain the empirical dependence on the pavement’s lifetime on the stress level and on the dry density.

SAT1-A4

Freedom of Will, Physics, and Human Intelligence: An Idea

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