

## The Future of Forecasting with Neural Networks

Hans Georg Zimmerman, Fraunhofer Society

I think nowadays we do not have to cite the universal approximation theorem repeatedly. In principle the neural network approaches are very powerful – but why do they fail in some studies? This could be because the application was too difficult (= not enough data to describe the underlying structure) or at the missing experience of some researchers in the methodological questions. The development of neural network methods in forecasting is more than 30 years old. There are not many people who have contributed to this subject over such a long-time span. On conferences I observe that some newcomers do mistakes that I know from the nineties.

First of all, in the workshop we will discuss which of the neural methods were successful and why this is the case or not. After all, often this can be analyzed by logical arguments instead of computer examples. Referring to human intelligence instead of artificial intelligence a second advantage of the neural network frame emerges: they allow the inclusion of many different a priori insights of a system into the modelling. Therefore, we can see the neural network method more as a thinking style including data, not as a toolbox in a black box style.

Beside teaching mathematical techniques, a goal of the workshop is the gain of a neural thinking style for model builders. Today we have many slim line algorithms in neural networks, but the future development of the method depends not only on the increasing computer power but also on the researchers as human thinkers. In 34 years, I have experienced in many cases the mutual assistance of applications and mathematical principals. Neural Networks allow the perspective from both sides.