

How to Describe Correlation in Interval Case?

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In many areas of science and engineering, we want to change a difficult-to-directly-change quantity – e.g., the economy’s growth rate. Since we cannot directly change the desired quantity, we need to find easier-to-change auxiliary quantities that are correlated with the desired quantity – in the sense that a change in the auxiliary quantity will cause the change in the desired quantity as well. How can we describe this intuitive notion of correlation in precise terms?

The traditional notion of correlation comes from situations in which there are many independent factors causing the predictive model to differ from the actual values and all these factors are of about the same size. In this case, the distribution of the difference between the model’s predictions and the actual values is close to normal. In many practical situations, however, there are a few major factors which are much larger than others. In this case, the distribution of the differences is not necessarily normal.

In this talk, we show how, in such situations, we can formalize the intuitive notion of correlation.