Alternative definitions of effects in path models with multidimensional blocks

Tormod Næs [1]Rosaria Romano [2], Oliver Tomic [3], Age K. Smilde [4], Kristian Hovde Liland [3]

[1] Nofima, Ås, Norway
[2] Federico II University of Naples, Naples, Italy
[3] Norwegian University of Life Sciences, Ås, Norway
[4] University of Amsterdam, Amsterdam, Netherlands

Introduction

Quantifying the effects of one node on another node in path modelling is well-defined in univariate analyses but is a more open problem when the nodes are multivariate. Attempts have been made before, though none are fully transparent and intuitive. We propose a new definition which is motivated by simple orthogonalisations and then generalised to flexible regression.

Purpose

The purpose of the study is to define an intuitive set of path effects for multidimensional blocks that also makes sense in the unidimensional case.

Methods

Three regressions are defined in the presence of an input block, an output block, and a set of blocks pointing to the output block, leading to definitions of the total effect, unique effect, interaction effect and additional effect.

Results

We will demonstrate results from simulations elucidating various aspects and real data. This also shows practical considerations for rank-deficient cases.

Conclusions

A definition is made available, and its consequences, strengths and weaknesses are demonstrated.