Analysis of m sets of symbolic interval variables.

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Abstract. This work presents a new approach to analyze a series of m $n \times p$ tables $X^{(1)}, \ldots, X^{(m)}$ of symbolic interval variables. In this new approach, we firstly define a space of intervals with laws of composition $\oplus$, $\otimes_1$, $\times$. This allows extending this reasoning to the matrices of intervals. Then, we define a $n \times p$ compromise matrix $\overline{X} = \left(\overline{X_{ij}}\right)_{i=1,\ldots,n;\ j=1,\ldots,p,}$ of type intervals, a measure of covariance between interval variables, a new measure of correlation η between interval variables and the product operator $\otimes_2$ between a matrix $n \times p$ of intervals and one p vector u. This way, we achieve a symbolic PCA of compromise. To express the variability of tables $X^{(1)}, \ldots, X^{(m)}$, they are projected on the principal axes of PCA of intervals of compromise. For the interpretation of factorial map, a new measure of correlation η will be used.

1 Introduction

Expert 1				
	Banana	Coffee	Tea	Cocoa
Region 1	[0.9,3.1]	[5.8,6.2]	[6.5,7.5]	[2.1,2.7]
Region 2	[4.8,5.2]	[2.9,3.1]	[2,2]	[3.1,3.4]
Region 3	[5.4,6.6]	[0.8,1.2]	[0.95,1.05]	[2.1,2.3]
Region 4	[6.9,7.9]	[0.75,1.25]	[1.85,2.15]	[1.4,2.0]
Region 5	[1.9,2.6]	[5,5]	[3.6,4.4]	[6.1,6.2]
Region 6	[2.8,3.2]	[3.8,4.9]	[3.6,4.4]	[7.1,8.0]

TAB. 1 – *Example of symbolic interval variable.*