

Enumerating extreme points of the polytopes of stochastic tensors: an optimization approach

Fuzhen Zhang, Nova Southeastern University, Fort Lauderdale, Florida

We are concerned with the extreme points of the polytopes of stochastic tensors. By a tensor we mean a multi-dimensional array over the real number field. A line-stochastic tensor is a nonnegative tensor in which the sum of all entries on each line (i.e., 1 free index) is equal to 1; a plane-stochastic tensor is a nonnegative tensor in which the sum of all entries on each plane (i.e., 2 free indices) is equal to 1. In enumerating extreme points of the polytopes of line- and plane-stochastic tensors of order 3 and dimension n , we consider the approach by linear optimization and present new lower and upper bounds. We also study the coefficient matrices that define the polytopes. (Joint work with Xiao-Dong Zhang.)

Keywords: multi-dimensional array, polytope, stochastic tensor