Mathematics of Deep Learning

Python Assignment

Q1. Create a tensor $\mathbf{T}$ of shape $(3, 5, 2)$ whose entries are *standard normal* variates, and do the following:

(i) Find the *shape* of $\mathbf{T}$.

(ii) Create a *diagonal tensor* out of it.

(iii) Write a function to examine if it's *super-symmetric*.

(iv) Find its *mode*-3 *fibres*.

Q2. For the tensor $\mathbf{T}$ in Q1,

(i) find its *frontal slices*

(ii) find the *outer product* of its *column fibres*, and the *shape* of the resulting tensor.

(iii) find its *n-mode product* with a random vector of suitable *shape*.

Q3. Create 3 pairs of matrices from $\mathbf{T}$ in Q1 such that they are compatible for *Kronecker product*, *Khatri-Rao product* and *Hadamard product* respectively. Also, compute the products.

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