where δ is the Kronecker (or discrete Dirac) symbol.

In this notation we can also write: $f_{IJ} = (\delta_I^I \times f_J^I) \circ f_I$, and $f_{IJ} = (f_I^J \times \delta_J^J) \circ f_J$.

Composition of measure and function transitions will be illustrated with the definitions and operations for factors. A transition of I to J can be used to transport any measure μ_I (on I) in order to obtain a measure μ_J on J; and in the other direction it can be used to associate with every function G^J (on J) a function F^I (on I).

Thus, we have: $\pi_J = f_J^I \circ \mu_I$ which, in detail, is: $\pi_j = \{\pi_j | j \in J\}$ and $\forall j \in J : \pi_j = \sum_{i \in I} f_j^i \mu_i$.

For the factors, then: $F^I = G^J \circ f_J^I$, and in greater detail: $F^I = \{F^i | i \in I\}$ and $\forall i \in I : F^i = \sum_{j \in J} G^j f_j^i$.

Composition rules (up and down index combination) can be noted here. These tensor composition rules are an extended form of product conformability for matrices.

Quadratic form of the moments of inertia, relative to the origin, of the cloud $N(J)$:

$$\sigma_{II} = (f_I^J \cdot f_I^J) \circ f_J$$
$$\sigma_{ii'} = \sum_j f_i^j f_{i'}^j f_j = \sum_j (f_{ij} f_{i'j} / f_j)$$

It can be shown ([15], p. 153) that the principal eigenvalue λ corresponding to eigenvector ϕ satisfies: $\phi^I \circ f_I^J \circ f_J^I - (\phi^I \circ f_I)\delta^I = \lambda \phi^I$. Furthermore it holds that $\delta^I \circ f_I^J \circ f_J^I = (\delta^I \circ f_I)\delta^I = \delta^I$; that is to say, δ^I is the first trivial eigenvector, i.e., the constant function equal to 1. The factor ϕ^I is zero mean for the measure f_I, i.e., $\phi^I \circ f_I = 0$.

We can right-multiply the eigen-equation above by f_I^J to get $(\phi^I \circ f_I^J) \circ (f_J^I \circ f_I^J) = \lambda(\phi^I \circ f_I^J)$. Consequently $\phi^I \circ f_I^J$ is a factor of the dual space.

Through consideration of the norms, it turns out that we can define factors on J, ϕ^J, in the following way: $\phi^J = (1/\sqrt{\lambda(\phi)})\phi^I \circ f_I^J$.

Benzécri [15] argues in favor of tensor notation: firstly to take account of more than two arguments or indices; and secondly to render symmetries much clearer than would otherwise be possible. Further motivation can be added: a matrix expresses a linear mapping (of rows onto columns or vice versa), a linear mapping of a set into itself, a bilinear form on the cross-product of a set with itself, and so on; with tensor notation, these different cases are clearly distinguished.