Suppose that \( \Sigma \) is a p × q orientationally uniform random matrix, and \( g(X) \) is a q-dimensional random vector with \( E(X) = 0 \) and \( \text{var}(X) = \Sigma \). Let \( \Sigma = \text{diag}(\lambda_1, \ldots, \lambda_p) \), \( \Sigma \) is the diagonal matrix containing the ordered \( \lambda_1, \ldots, \lambda_p \) are the ordered eigenvalues of \( \Sigma \) in the sense that \( \lambda_1 \geq \ldots \geq \lambda_p \), and so on, were \( \lambda = \text{diag}(\lambda_1, \ldots, \lambda_p) \) is a a \( p \times p \) diagonal matrix with \( a_{i,i} \leq \lambda_i \) for all \( i \). Then the random variables \( a_1, a_2, \ldots, a_p \) are exchangeable.

**Theorem**
Suppose \( a \) is a p × q orientationally uniform random matrix, \( g(X) \) is a q-dimensional random vector and \( Y \) is a random variable such that \( E(Y) = 0 \), \( \text{var}(Y) = \beta \) positive definite matrix and \( c \) is any constant. Then we have \( \text{var}(Y)^{1/2} \leq \beta \). Hence, \( \beta = \text{var}(Y)^{1/2} \) where \( \beta \) is a \( p \times p \) diagonal matrix with \( a_{i,i} \leq \beta_i \) for all \( i \). Then the random variables \( a_1, a_2, \ldots, a_p \) are exchangeable.

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