Package ‘MMiRKAT’

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Type Package

Title Multivariate Microbiome Regression-based Kernel Association Test (MMiRKAT)

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Imports CompQuadForm, vegan

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Description This package tests the association between microbiome community composition and multiple outcomes of interest via the kernel machine regression framework.

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D2K

Distance to Kernel

Description

This function transfers a distance matrix to a kernel matrix

Usage

D2K(D)

Arguments

D A distance matrix
This function transfers a distance matrix $D$ to a kernel matrix $K$ by $K = -(I - ee'/n)D^2(I - ee'/n)/2$, where $I$ is the identity matrix, $e$ is the column vector of all ones, and $D^2$ is the element wise matrix square.

A kernel matrix of the same dimension as the original distance matrix

Zhao et al. (2015). Testing in microbiome profiling studies with MiRKAT, the Microbiome Regression-based Kernel Association Test (MiRKAT). The American Journal of Human Genetics, 96(5): 797-807

library(vegan)

n=200
m=500

OTU=matrix(runif(n*m,0,1),n,m)

D=as.matrix(vegdist(OTU, method="bray"))

D2K(D)

MMiRKAT Multivariate Microbiome Regression-based Kernel Association Test

This function tests the association between microbiome community composition and multiple outcomes

Usage

MMiRKAT(Y, X = NULL, K)

Arguments

Y Outcome matrix, each row is a sample and each column is an outcome variable

X Covariate matrix, which is adjusted for testing association between outcomes and microbiome composition

K Microbiome kernel matrix

The function tests the association between overall microbiome composition and multiple outcomes using the kernel machine regression framework

A p-value for the testing of association between overall microbiome composition and multiple outcomes after adjusting for the effects of covariates
References

Zhao et al. (2015). Testing in microbiome profiling studies with MiRKAT, the Microbiome Regression–based Kernel Association Test (MiRKAT). The American Journal of Human Genetics, 96(5): 797-807

Examples

```r
library(vegan)
library(CompQuadForm)
n=200
p=10
Y=matrix(rnorm(n*p,0,1),n,p)
m=500
OTU=matrix(runif(n*m,0,1),n,m)
D=as.matrix(vegdist(OTU, method="bray"))
K.BC=D2K(D)
MMiRKAT(Y,X=NULL,K.BC)
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