Package ‘CommonMean.Copula’

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Type   Package
Title  Common Mean Vector under Copula Models
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Description Estimate bivariate common mean vector under copula models with known correlation. In the current version, available copulas include the Clayton, Farlie-Gumbel-Morgenstern (FGM), and Gaussian copulas. See Shih et al. (2019) <doi:10.1080/02331888.2019.1581782> for details under the FGM copula.
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Description

Estimate bivariate common mean vector under copula models with known correlation. A maximum likelihood estimation procedure is employed. In the current version, available copulas include the Clayton, Farlie-Gumbel-Morgenstern (FGM), and Gaussian copulas. See Shih et al. (2019) for details under the FGM copula.

Details

The method implemented in this package can be used for bivariate meta-analysis. See Shih et al. (2019) for an example of bivariate entrance exam data analysis under the FGM copula.

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References


Usage

```
CommonMean.Copula(Y1, Y2, Sigma1, Sigma2, rho, copula = "Clayton")
```

Arguments

- `Y1`: Outcome 1
- `Y2`: Outcome 2
- `Sigma1`: Standard deviation of outcome 1.
- `Sigma2`: Standard deviation of outcome 2.
- `rho`: Correlation coefficient between outcomes.
- `copula`: The copula to be used with possible options "Clayton", "FGM", and "normal".
Details

We apply "optim" routine to maximize the log-likelihood function. In addition, boundary corrected correlations will be used (Shih et al., 2019).

Value

| Outcome 1 | Outcome 1. |
| Outcome 2 | Outcome 2. |
| Correlation | Correlation coefficient between outcomes. |
| Sample size | Sample size. |
| Copula | Selected copula. |
| Copula parameter | Copula parameter. |
| Corrected correlation | Boundary corrected correlations. |
| CommonMean 1 | Estimation results of outcome 1. |
| CommonMean 2 | Estimation results of outcome 2. |
| V | Covariance matrix of the common mean vector estimate. |
| Log-likelihood values | Fitted log-likelihood values. |

References


Examples

library(CommonMean.Copula)
Y1 = c(35,25,30,50,60) # outcome 1
Y2 = c(30,30,50,65,40) # outcome 2
Sigma1 = c(1.3,1.4,1.5,2.0,1.8) # SE of outcome 1
Sigma2 = c(1.7,1.9,2.5,2.2,1.8) # SE of outcome 2
rho = c(0.4,0.7,0.6,0.7,0.6) # correlation between two outcomes
CommonMean.Copula(Y1,Y2,Sigma1,Sigma2,rho) # input
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