# Package 'bivarRIpower'

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**Type** Package

**Title** Sample size calculations for bivariate longitudinal data

**Version** 1.2

**Date** 2010-12-02

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**Description** Implements sample size calculations for bivariate random intercept regression model that are described in Comulada and Weiss (2010)

**License** GPL (>= 2)

**LazyLoad** yes

**Repository** CRAN

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**NeedsCompilation** no

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`bivarRIpower-package` *Sample size calculations for bivariate longitudinal data*

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### Description

Provides function to carry out sample size calculations for correlations that occur between random intercepts, residuals, and observations in a bivariate longitudinal model. Maximum likelihood estimates are used for correlation variances. Sample size is calculated under one-sample z-test framework. Details of calculations are given in Comulada and Weiss (2010).

**Details**

| | |
|---|---|
| Package: | bivarRIpower |
| Type: | Package |
| Version: | 1.2 |
| Date: | 2010-12-02 |
| License: | GPL (\>=2) |
| LazyLoad: | yes |

## Author(s)

W. Scott Comulada and Robert E. Weiss

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## References

Comulada WS and Weiss RE. (2010). Power calculations for correlations between bivariate longitudinal data. Statistics in Medicine. 29(27): 2811-2824.

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`bivarcalcn` *Function to calculate necessary sample size to achieve given power for correlation parameters in bivariate linear regression model*

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## Description

Function carries out maximum likelihood sample size calculations for one of four types of correlations in a bivariate random-intercept (RI) linear regression model discussed in Comulada and Weiss (2010): 1) Correlations between RI; 2) residuals, 3) observations measured at the same time point (concurrent); and 4) observations measured at different time points (lagged). Standard deviations for variance parameters and correlations between RI and residuals are specified by the user. Correlations between concurrent and lagged observations are calculated. Sample size is calculated for specified correlation and power under a two-sided test with a .05 alpha level. Powers for remaining three non-specified correlations are also shown.

## Usage

```
bivarcalcn(power, powerfor, timepts, d1, d2, p, p1, s1, s2, r, r1)
```

## Arguments

| | |
|---|---|
| `power` | Power to achieve (usually at least .80) |
| `powerfor` | Correlation to base sample size calculation on. Possible entries are 'RI', Random intercepts; 'RESIDUAL', Residuals; 'YYcon', Concurrent outcome observations; or 'YYlag', Lagged outcome observations. |
| `timepts` | Number of time points |

| | |
|---|---|
| d1 | Standard deviation (SD) for 1st random intercept |
| d2 | SD for 2nd random intercept |
| p | Correlation between RI under null hypothesis |
| p1 | Correlation between RI under alternative hypothesis |
| s1 | SD for 1st residual |
| s2 | SD for 2nd residual |
| r | Correlation between residual under null hypothesis |
| r1 | Correlation between residual under alternative hypothesis |

## Value

Returns sample size (labled as 'clusters') and parameters specified for calculations

## Author(s)

W. Scott Comulada and Robert E. Weiss

## References

Comulada WS and Weiss RE. (2010). Power calculations for correlations between bivariate longitudinal data. Statistics in Medicine. 29(27): 2811-2824.

## Examples

```
# Example: Calculate necessary sample size to achieve 80 percent power at 5
# percent alpha level for null and alternative hypotheses that correlation
# between RI is 0 and .2, respectively, across 6 time points.  Other
# covariance parameter are set as follows: Correlation between residuals = 0;
# Standard deviations: 1st RI = 1, 2nd RI = 2, 1st residual = .5,
# 2nd residual = .75
library(bivarRIpower)
bivarcalcn(power=.80,powerfor='RI',timepts=6,d1=1,d2=2,p=0,p1=.2,s1=.5,s2=.75,
r=0,r1=.1)
```

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