

# Package ‘CongreveLamsdell2016’

February 6, 2019

**Version** 1.0.0

**Date** 2019-01-28

**Title** Distance metrics for trees generated by Congreve and Lamsdell (2016)

**Description** Includes the 100 datasets simulated by Congreve and Lamsdell (2016) <doi:10.1111/pala.12236>, and analyses of the partition and quartet distance of reconstructed trees from the generative tree, as analysed by Smith (2019) <doi:10.1098/rsbl.2018.0632>.

**URL** <https://github.com/ms609/CongreveLamsdell2016>

**BugReports** <https://github.com/ms609/Quartet/issues>

**Copyright** Data from Congreve & Lamsdell (2016) released under a CC0 license <doi:10.5061/dryad.7dq0j/1>.

**License** GPL (>= 2)

**Encoding** UTF-8

**Language** en-GB

**Depends** R (>= 3.4.0)

**Imports** Ternary

**Suggests** ape,  
bookdown,  
knitr,  
phangorn,  
Quartet,  
rmarkdown,  
TreeSearch (> 0.2.0),  
usethis

**LazyData** true

**ByteCompile** true

**VignetteBuilder** knitr

**RoxygenNote** 6.1.1

**Roxygen** list(markdown = TRUE)

**R topics documented:**

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clCI	<i>Consistency indices</i>
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**Description**

Consistency indices of Congreve & Lamsdell datasets.

**Usage**

clCI

**Format**

An object of class `numeric` of length 100.

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clColours	<i>Default colours for analyses.</i>
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**Description**

Default colours for analyses.

**Usage**

clColours

**Format**

An object of class `character` of length 8.

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`cIInitializeTernaryQuarts`*Initialize ternary plots for quartet plotting*

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**Description**

Sets up a blank ternary plot ready for analytical results to be added.

**Usage**

```
cIInitializeTernaryQuarts(zoom = 1, padding = 0.1, gridLines = 10,  
  fontSize = 1, gridCol = "#dBdBdB", backgroundCol = "#FdFdFe",  
  xLim = c(0, 1/zoom) - 0.01, yLim = c(0.5 - (1/zoom), 0.5),  
  isometric = TRUE)
```

```
cIInitializeTernarySplits(fontSize = 1, xLim = NULL, yLim = NULL,  
  gridCol = "#dBdBdB", backgroundCol = "#FdFdFe", padding = 0.1,  
  isometric = TRUE)
```

**Arguments**

<code>zoom</code>	Level of magnification (times), used to adjust ticks and scale.
<code>padding</code>	Padding, passed to TernaryPlot.
<code>gridLines</code>	Number of grid lines, passed to TernaryPlot as <code>grid.lines</code> .
<code>fontSize</code>	Font size, passed to TernaryPlot as <code>lab.cex</code> .
<code>gridCol</code>	Colour, passed to TernaryPlot as <code>grid.col</code> .
<code>backgroundCol</code>	Background colour, passed to TernaryPlot as <code>col</code> .
<code>xLim, yLim</code>	x and y limits, passed to TernaryPlot as <code>xlim, ylim</code> .
<code>isometric</code>	Logical specifying whether plot should be isometric, passed to TernaryPlot as <code>isometric</code> .

**Functions**

- `cIInitializeTernarySplits`: Initialize ternary plots for partition plotting.

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cIPhyDat

*100 simulated data matrices*

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### Description

Contains the 100 simulated matrices generated by Congreve & Lamsdell (2016) using a heterogeneous Markov-k model, generated from the [cIReferenceTree](#) topology, with all branches sharing an equal length.

### Usage

cIPhyDat

cIMatrices

### Format

- cIPhyDat: A list with 100 entries, each comprising a phyDat object of 55 characters for 22 taxa.
- cIMatrices: A list with 100 entries, each comprising a list of character tokens for each simulated character, as read from raw nexus files using `ape::read.nexus.data`. The four dummy 'characters' have been removed.

### Source

<http://datadryad.org/resource/doi:10.5061/dryad.7dq0j>

### References

- Congreve, C. R. & Lamsdell, J. C. (2016). Implied weighting and its utility in palaeontological datasets: a study using modelled phylogenetic matrices. *Palaeontology* 59(3), 447–465. doi: [10.1111/pala.12236](https://doi.org/10.1111/pala.12236).
- Congreve, C. R. & Lamsdell, J. C. (2016). Data from: Implied weighting and its utility in palaeontological datasets: a study using modelled phylogenetic matrices. Dryad Digital Repository. doi: [10.5061/dryad.7dq0j](https://doi.org/10.5061/dryad.7dq0j).

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cIPlotQuartets

*Plot results*

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### Description

Plots the results of the analyses of the Congreve & Lamsdell (2016) datasets.

**Usage**

```

cIPlotQuartets(dataset, tree, cex = 1.1, pch = 2,
  col = CongreveLamsdell2016::cIColours, ...)

cIPlotAverageQuartets(dataset, cex = 1.1, pch = 2,
  col = CongreveLamsdell2016::cIColours, ...)

cIPlotTheseAverageQuartets(dataset, cex = 1.1, pch = 2,
  col = "black", ...)

cIPlotSplits(dataset, tree, cex = 1.1, pch = 2,
  col = CongreveLamsdell2016::cIColours, ...)

cIPlotTheseAverageSplits(dataset, cex = 1.1, pch = 2, col = "black",
  ...)

cIPlotTheseBestAverageSplits(dataset, cex = 1.1, pch = 2,
  col = "black", ...)

cIPlotAverageSplits(dataset, cex = 1.1, pch = 2,
  col = CongreveLamsdell2016::cIColours, ...)

cIPlotBestAverageSplits(dataset, cex = 1.1, pch = 2,
  col = CongreveLamsdell2016::cIColours, ...)

```

**Arguments**

dataset	Dataset to plot, for example <a href="#">cIBootGcQuartets</a> .
tree	Integer specifying which tree to plot.
cex, pch, ...	Graphical parameters to pass to <a href="#">JoinTheDots</a> .
col	Named vector specifying colours to use to plot each analysis, named to match <code>names(dataset)</code> .

**Value**

Returns [invisible](#).

**Functions**

- `cIPlotAverageQuartets`: Plots average across all 100 trees.
- `cIPlotTheseAverageQuartets`: Plot average for single dataset across all 100 trees.
- `cIPlotSplits`: Splits equivalent of `cIPlotQuartets`.
- `cIPlotTheseAverageSplits`: Splits equivalent of `cIPlotTheseAverageQuartets`.
- `cIPlotTheseBestAverageSplits`: Splits equivalent of `cIPlotTheseBestAverageQuartets`.
- `cIPlotAverageSplits`: Splits equivalent of `cIPlotAverageQuartets`.
- `cIPlotBestAverageSplits`: Splits equivalent of `cIPlotAverageQuartets`.

**Author(s)**

Martin R. Smith

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clReferenceTree

*Tree topology for matrix simulation*

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**Description**

The tree topology used to generate the matrices in [clMatrices](#) Congreve & Lamsdell (2016).

**Usage**

clReferenceTree

**Format**

A single phylogenetic tree saved as an object of class phylo.

**Source**

Congreve & Lamsdell (2016).

**References**

- Congreve, C. R. & Lamsdell, J. C. (2016). Implied weighting and its utility in palaeontological datasets: a study using modelled phylogenetic matrices. *Palaeontology* 59(3), 447–465. doi: [10.1111/pala.12236](https://doi.org/10.1111/pala.12236).
- Congreve, C. R. & Lamsdell, J. C. (2016). Data from: Implied weighting and its utility in palaeontological datasets: a study using modelled phylogenetic matrices. Dryad Digital Repository. doi: [10.5061/dryad.7dq0j](https://doi.org/10.5061/dryad.7dq0j).

**Examples**

```
library(ape) # Contains tree plotting functions
data(clReferenceTree)
plot(clReferenceTree)
```

---

`clResults`*Congreve and Lamsdell tree distances*

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**Description**

Distance of CL trees from generative tree.

**Usage**`clBremQuartets``clBremPartitions``clMkvPartitions``clMkvQuartets``clBootFreqPartitions``clBootFreqQuartets``clJackFreqPartitions``clJackFreqQuartets``clBootGcPartitions``clBootGcQuartets``clJackGcPartitions``clJackGcQuartets`**Format**

An object of class `list` of length 7.

**Details**

For each of the 100 matrices generated by Congreve & Lamsdell (2016), I conducted phylogenetic analysis under different methods:

- Mkv: using the Markov K model in MrBayes;
- eq: using equal weights in TNT;
- k1, k2, k3, k5, kX: using implied weights in TNT, with the concavity constant ( $k$ ) set to 1, 2, 3, 5, or 10;

- kC: by taking the strict consensus of all trees recovered by implied weights parsimony analysis under the  $k$  values 2, 3, 5 and 10 (but not 1).

For each analysis, I recorded the strict consensus of all optimal trees, and also the consensus of trees that were suboptimal by a specified degree.

I then calculated, of the total number of quartets or partitions that were resolved in the reference tree, how many were the same or *different* in the tree that resulted from the phylogenetic analysis, and how many were not resolved in this tree ( $r2$ ).

The data object contains a list whose elements are named after the methods, as listed above.

Each list entry is a three-dimensional array, whose dimensions are:

1. The suboptimality of the tree. Different measures of node support are employed:
  - Mkv: Posterior probabilities, at 2.5% intervals (50%, 52.5%, ... 97.5%, 100%).
  - Brem: Bremer supports: the consensus of all trees that are (equal weights) 0, 1, ..., 19, 20 steps less optimal than the optimal tree (implied weights: the consensus of all trees that are  $0.73^{(19:0)}$  less optimal than the optimal tree).
  - Boot: Bootstrap supports (symmetric resampling,  $p = 0.33$ ).
  - Jack: Jackknife supports ( $p = 0.36$ ).

Boot and Jack results are reported both as the frequency of splits among replicates, and using the gc (Groups Present / Contradicted) measure (Goloboff *et al.* 2003); frequency columns correspond to 100%, 97.5%, 95% ... 0% support; gc columns correspond to 100%, 95%, ... 0% present, 5%, 10%, ... 100% contradicted.

2. Counts of the condition of each quartet or partition:
  - Q: The total number of quartets defined on 22 taxa.
  - N: The total number of partitions present, counting each tree separately.
  - P1: The number of partitions in tree 1 (the reconstructed tree).
  - P2: The number of partitions in tree 2 (the generative tree).
  - s: The number of quartets or partitions resolved identically in each tree. \* d: The number of quartets resolved differently in each tree.
  - d1: The number of partitions resolved in tree 1, but contradicted by tree 2.
  - d2: The number of partitions resolved in tree 2, but contradicted by tree 1.
  - r1: The number of partitions or quartets resolved in tree 1 that are neither present in nor contradicted by tree 2.
  - r2: The number of partitions or quartets resolved in tree 2 that are neither present in nor contradicted by tree 1.
  - u: The number of quartets that are not resolved in either tree.
3. The number of the matrix, from 1 to 100.

## Source

Congreve, C. R. & Lamsdell, J. C. (2016). Implied weighting and its utility in palaeontological datasets: a study using modelled phylogenetic matrices. *Palaeontology* 59(3), 447–465. doi: [10.1111/pala.12236](https://doi.org/10.1111/pala.12236).



## References

Goloboff, P. A., J. S. Farris, M. Källersjö, B. Oxelman, M. J. Ramírez, and C. A. Szumik. 2003. Improvements to resampling measures of group support. *Cladistics* 19, 324–332. doi: [10.1016/S07483007\(03\)000604](https://doi.org/10.1016/S07483007(03)000604).

## See Also

[clMatrices](#), [clReferenceTree](#).

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