Package ‘eulerian’

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Title eulerian: A package to find eulerian paths from graphs
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Description An eulerian path is a path in a graph which visits every edge exactly once. This package provides methods to handle eulerian paths or cycles.
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Description

An eulerian path is a path in a graph which visits every edge exactly once. This package provides methods to handle eulerian paths or cycles.
### Examples

```r
require(graph)
require(eulerian)
g <- new("graphNEL", nodes=LETTERS[1:4], edgemode="directed")
g <- addEdge(graph=g, from=LETTERS[1:4], to=LETTERS[c(2:4,1)])
if(hasEulerianCycle(g)){
ecycle <- eulerian(g)
writeLines(paste(ecycle, collapse=" -> "))
}
```

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**eulerian**  
*Method for finding an eulerian path or cycle.*

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### Description

An eulerian path is a path in a graph which visits every edge exactly once. This function returns an eulerian path from a graph (if there is any). It works for both directed and undirected graphs.

### Usage

```r
eulerian(graph, start = NULL)
```

### Arguments

- `graph`  
a graphNEL object.
- `start`  
character or NULL. The name of the start node of an eulerian path.

### Details

If `start` is not NULL, then eulerian returns a path starting from it. Otherwise, the start node is automatically selected.

### Value

A character vector representing an eulerian path/cycle in `graph`. Each entry in the vector represents the name of a node in the graph.

### Author(s)

Ashis Saha
hasEulerianCycle

Examples

require(graph)
require(eulerian)
g <- new("graphNEL", nodes=LETTERS[1:4], edgemode="unirected")
g <- addEdge(graph=g, from=LETTERS[1:3], to=LETTERS[2:4])
ep <- eulerian(g)

hasEulerianCycle(g)

Description

An eulerian cycle is a path in a graph which visits every edge exactly once, and starts and ends at the same node.

Usage

hasEulerianCycle(graph)

Arguments

graph a graphNEL object.

Details

A graph will have an euler cycle if and only if every node has same number of edges entering into and going out of it.

Value

TRUE, if graph has an euler cycle. FALSE, otherwise.

Author(s)

Ashis Saha

Examples

require(graph)
require(eulerian)
g <- new("graphNEL", nodes=LETTERS[1:4], edgemode="directed")
g <- addEdge(graph=g, from=c(LETTERS[1:3], "A", "B"),
to=c(c("C", "D", "E", "F", "G", "H", "I", "J", "K", "L")))
ep <- eulerian(g, "6")

hasEulerianCycle Method for checking whether an eulerian cycle exists.
hasEulerianPath  Method for checking whether an eulerian path exists.

Description
An eulerian path is a path in a graph which visits every edge exactly once.

Usage
hasEulerianPath(graph, start = NULL)

Arguments
  graph a graphNEL object.
  start character or NULL. The name of the start node of an eulerian path.

Details
If start is NULL, this function returns whether there exists any eulerian path in graph. If start is not NULL, the function determines if there exists an eulerian path starting from start.

Value
  TRUE, if there is an eulerian path. FALSE, otherwise.

Author(s)
Ashis Saha

Examples
require(graph)
require(eulerian)
g <- new("graphNEL", nodes=LETTERS[1:4], edgemode="undirected")
g <- addEdge(graph=g, from=LETTERS[c(1:4)], to=LETTERS[c(2:4,4)])
hasEulerianPath(g) #TRUE
hasEulerianPath(g, "B") #FALSE
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