# 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.

**License** GPL-2

**Depends** R(>= 2.15.0), methods

**Imports** graph

**NeedsCompilation** no

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## R topics documented:

## eulerian-package *eulerian: A package to handle eulerian paths from graphs*

### 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

```
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=" -> "))
}
```

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

### 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

```
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

## Examples

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

g <- new("graphNEL", nodes=as.character(1:10), edgemode="directed")
g <- addEdge(graph=g, from=c("1","2","2","3","4","5","6","6","7","8","9","10"),
to=c("10","1","6","2","2","4","5","8","9","7","6","3"))
ep <- eulerian(g, "6")
```

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# hasEulerianCycle *Method for checking whether an eulerian cycle exists.*

---

## 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 auler 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=LETTERS[1:4], to=LETTERS[c(2:4,1)])
hasEulerianCycle(g)
```

---

`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
```

# Index