## NAME

CyclesDetection

## SYNOPSIS

use CyclesDetection;

use CyclesDetection qw(:all);

## DESCRIPTION

CyclesDetection class provides the following methods:

new, Copy, DetectCycles, DetectCyclesUsingCollapsingPathGraphMethodology, GetAllCyclicPaths, GetIndependentCyclicPaths, StringifyCyclesDetection

Cycles in a Graph are detected using collapsing path graph [Ref 31] methodology.

## METHODS

### new

```
$NewCyclesDetection = new CyclesDetection($Graph);
```

Using specified *Graph*, new method creates a new CyclesDetection object and returns newly created CyclesDetection object.

### Copy

```
$NewCyclesDetection = $CyclesDetection->Copy();
```

Copies *CyclesDetection* and its associated data using Storable::dclone and returns a new CyclesDetection object.

### DetectCycles

```
$CyclesDetection->DetectCycles();
```

Detects all cycles in a graph and returns *CyclesDetection*.

### DetectCyclesUsingCollapsingPathGraphMethodology

```
$CyclesDetection->DetectCyclesUsingCollapsingPathGraphMethodology();
```

Detects all cycles in a graph using collapsing path graph [Ref 31] methodology and returns *CyclesDetection*.

### GetAllCyclicPaths

```
@AllCyclicPaths = $CyclesDetection->GetAllCyclicPaths();
$NumOfAllCyclicPaths = $CyclesDetection->GetAllCyclicPaths();
```

Returns an array containing references to all cyclic paths identified during cycles detection. In scalar text, number of cycles is returned.

### GetIndependentCyclicPaths

```
@IndependentCyclicPaths = $CyclesDetection->GetAllCyclicPaths();
$NumOfIndependentCyclicPaths = $CyclesDetection->GetAllCyclicPaths();
```

Returns an array containing references to independent cyclic paths identified during cycles detection. In scalar text, number of cycles is returned.

A set of independent cycles identified during cycles detection doesn't correspond to the basis set of rings or smallest set of smallest rings (SSSR) [ Refs 29-30 ]; instead, set of cycles indentified as independent cycles simply correpond to cycles which contain no other cycle as their subcycles and can't be described as a linear combination of smaller cycles. And it also happens to contain all the rings in basis set of rings and SSSR. In other words, it's a superset of a basis set of cycles and SSSR. For example, six four membered cycles are indentified for cubane, which is one more than the basis set of cycles.

### StringifyCyclesDetection

```
$String = $CyclesDetection->StringifyCyclesDetection();
```

Returns a string containing information about *CyclesDetection* object.

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## SEE ALSO

Graph.pm, Path.pm, PathGraph.pm

## COPYRIGHT