The giRaph package for graph representation in R
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The giRaph package for graph representation in R
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A broad notion of graph

- hyper-edges, such as
  b--d--e
  f->e>b--d->a--c
- loops, such as
  i<>i
- multiple edges, such as
  b->d, d->b
e->h, e->h, e->h
f--i, f->i

Represented via incidence list

```R
G <- new("incidenceList", V = letters[1:12],

E = list(d(6,5,c(2,4),c(1,3)), u(2,4,5), d(2,4), d(4,2), d(1,7), d(3,7), d(4,7), d(5,8),
  d(5,8), d(5,8), u(6,9), d(6,9), u(9,9),
  d(9,8), d(9,12), u(7,8), u(8,12),
  u(12,11), u(11,7), u(11,8), d(11,10)))

G
```

An object of class "incidenceList"

V = {a,b,c,d,e,f,g,h,i,j,k,l}

E = {f->e->b--d->a--c, b--d--e, b->d, d->b, a->g, c->g, d->g, e->h, e->h, e->h, f--i, f->i, i<>i, i->h, i->l, g--h, h--l, l--k, k--g, k--h, k->j}

Represented via incidence matrix

```R
I <- as(G, "incidenceMatrix")
```

or via adjacency list

```R
adjacencyList(mg[5:9]) # gets induced subgraph first
```

e -> {h,h,h}
f -- {i}

or via adjacency matrix

```R
adjacencyMatrix(sg[7:12]) # gets induced subgraph first
```

Setting representations

Representation in use can be changed

```R
representation in use can be changed

> incidenceMatrix(gg) <- incidenceMatrix(gg)
```

or a consistent representation can be added

```R
adjacencyMatrix(mg, force = F) <- adjacencyMatrix(mg)
```

Working with vertices & edges

Possible via overloaded operators

```R
ng <- mg+v("a","y") # adds two isolated vertices
ng <- mg+v("a") # removes a vertex (& an edge...)
ng <- mg+u(1,13) # adds an undirected edge (b->y)
ng <- mg-d(1,3) # removes a directed edge (b->d)
ng <- mg+u("b","d","y") # gets an induced subgraph
```

Connection to other packages

Suggests (but does not depend on)


References
