Graphs in R

G. Marchetti

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Using `ggm`, `grBase`, `igraph` together

Using **gRbase**

Adjacency matrix

```
A <- ug(~a*b, ~b*c*d, ~e)
as(A, "matrix")
```

```
  a b c d e
a 0 1 0 0 0
b 1 0 1 1 0
c 0 1 0 1 0
d 0 1 1 0 0
e 0 0 0 0 0
```

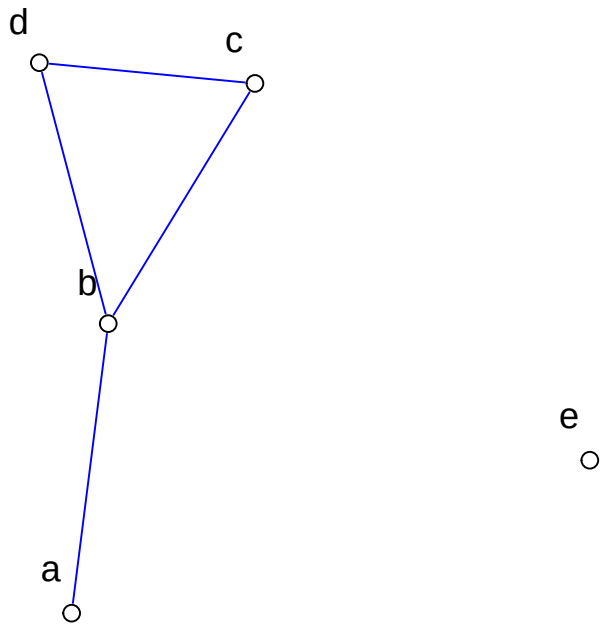
Using **ggm**

Adjacency matrix and plot

```
G <- UG(~a*b + b*c*d + e)
G
```

```
  a b c d e
a 0 1 0 0 0
b 1 0 1 1 0
c 0 1 0 1 0
d 0 1 1 0 0
e 0 0 0 0 0
```

```
drawGraph(G, layout = layout_nicely)
```



Find cliques

With **gRbase*

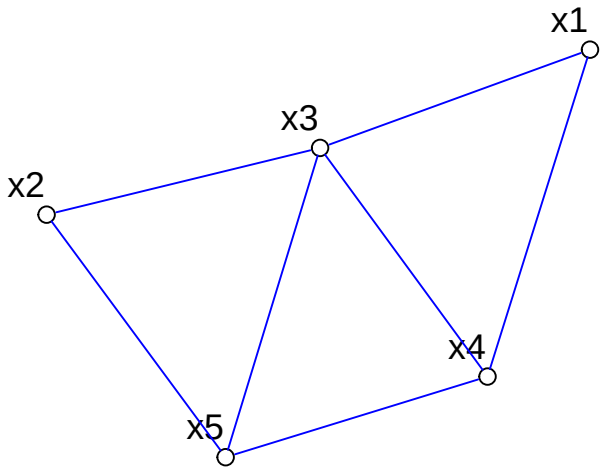
```
get_cliques(A)
```

```
[[1]]
[1] "e"

[[2]]
[1] "a" "b"

[[3]]
[1] "b" "c" "d"
```

Separation

With **ggm** and **igraph**

```
G <- UG( ~ x1*x3*x4 + x2*x3*x5 + x3*x4*x5)
drawGraph(G, layout = layout_nicely)
```



With **gRbase** and **igraph**

```
g <- graph_from_adjacency_matrix(G, mode = "undirected")
separates("x5", "x1", "x4", g)
```

```
[1] FALSE
```

```
separates("x5", "x1", c("x4","x3"), g)
```

```
[1] TRUE
```

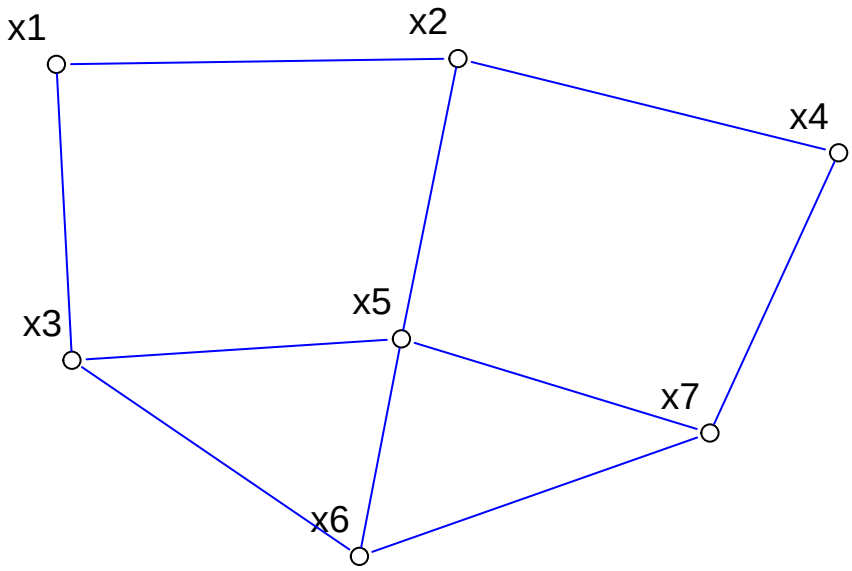
```
get_cliques(g)
```

```
[[1]]
[1] "x1" "x3" "x4"

[[2]]
[1] "x3" "x5" "x4"

[[3]]
[1] "x3" "x5" "x2"
```

Exercise

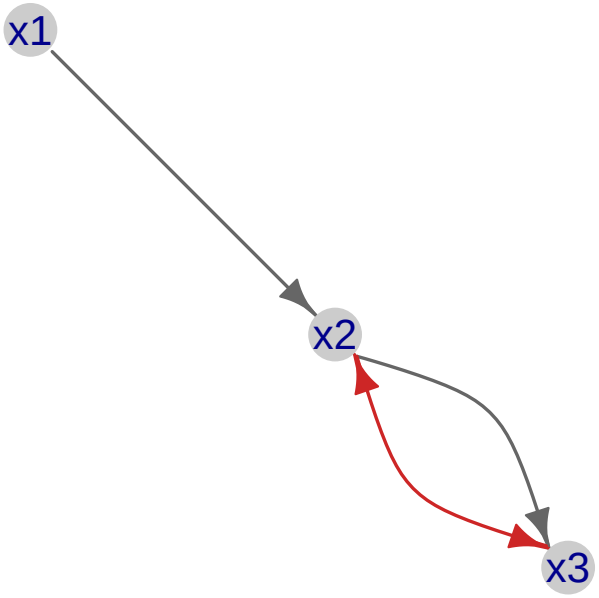
Lauritzen's graph

```
G <- UG(~ x1*x2 + x2*x5 + x5*x3 +
          + x1*x3 + x2*x4 + x4*x7 +
          + x7*x5 + x3*x6 + x5*x6 + x7*x6)
drawGraph(G, layout = layout_nicely)
```



Plot with ggm

```
source("~/Documents/R_packages/ggm/plotGraph2.R")
D <- makeMG(dg = DAG(x2 ~ x1 + xH, x3 ~ x2 + xH))
options(repr.plot.width = 4, repr.plot.height = 4)
sg <- SG(D, M = "xH")
plotGraph2(sg, tcltk = FALSE, dashed = FALSE)
```


x1
x2
x3