dyad and triad sequences

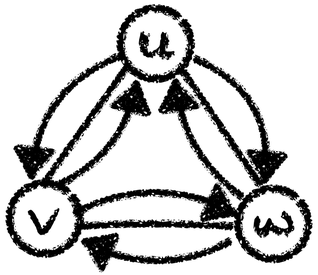
node attribute X undirected relation Y directed relation Z

dyad sequences

$$S_{uv} = (X_u, X_v, Y_{uv}, Z_{uv}, Z_{vu})$$

triad sequences

$$S_{uvw} = (X_{uvw}, Y_{uvw}, Z_{uvw})$$



where

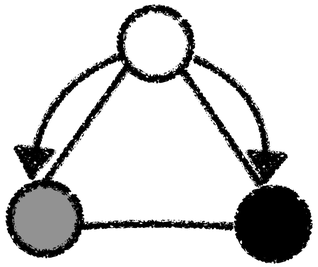
$$X_{uvw} = (X_u, X_v, X_w)$$
$$Y_{uvw} = (Y_{uv}, Y_{uw}, Y_{vw})$$
$$Z_{uvw} = (Z_{uv}, Z_{vu}, Z_{uw}, Z_{wu}, Z_{vw}, Z_{wv})$$

example

$S_{uv} = (1,0,\ 1,\ 0,1)$

example

$S_{uvw} = (0,1,2,\ 1,1,1,\ 1,0,1,0,0,0)$



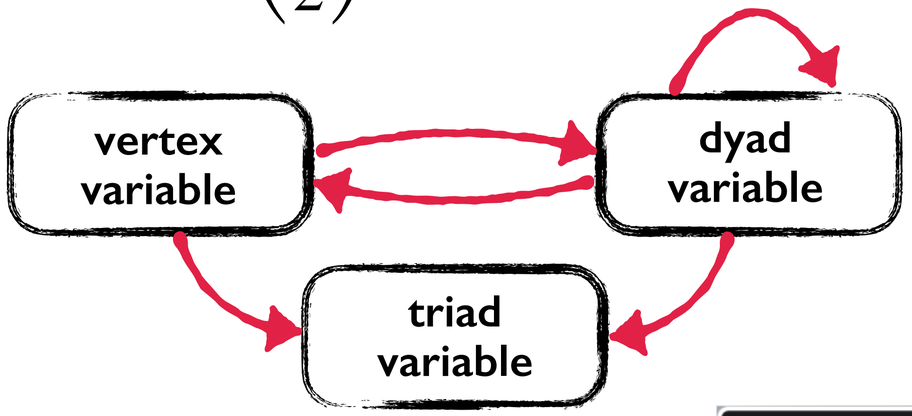
index multiple variables of each kind e.g. for dyad variables:

$$(X_{1u}, X_{1v}, X_{2u}, X_{2v}, \ldots, Y_{1uv}, Y_{2uv}, \ldots, Z_{1uv}, Z_{1vu}, Z_{2uv}, Z_{2vu}, \ldots)$$

example: network study of corporate law firm

number of observations:

vertices: $n = 71$ # dyads: $\binom{n}{2} = 2485$ # triads: $\binom{n}{3} = 57155$



dataframe of observed and categorized vertex variables:

```
##   senior status gender office years age practice lawschool
## 1      1      1      1      0     2   2        1          0
## 2      2      1      1      0     2   2        0          0
## 3      3      1      1      1     1   2        1          0
## 4      4      1      1      0     2   2        0          2
## 5      5      1      1      1     2   2        1          1
```

```
df.att.var <- data.frame(
   senior    = df.att$senior,
   status    = df.att$status,
   gender    = df.att$gender,
   office    = df.att$office-1,
   years     = ifelse(df.att$years<=3,0,
               ifelse(df.att$years<=13,1,2)),
   age       = ifelse(df.att$age<=35,0,
                 ifelse(df.att$age<=45,1,2)),
   practice = df.att$practice,
   lawschool= df.att$lawschool-1)
```