Zero Forcing vs Vertex Cover

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```
##
## Attaching package: 'gridExtra'

## The following object is masked from 'package:dplyr':
##
##     combine
```

Relationship

When considering the larger question of relationships between these graph variables and how they change for different classification labels, the first approach was to assess scatterplots of two randomly chosen numeric variables, labeled or faceted by an additional randomly chosen classification. Thus, when approaching the specific question of the relationship between the zero forcing number and the vertex cover number, the first approach was modeled . When the two variables (zero forcing number and vertex covering number) are plotted for the two subsets of graphs (claw free and not claw free), a relationship can be seen in the claw free classification that isn't present in the visualization of the not claw free graph: there are no points present above the line $y = x$ for the claw free graphs. Under further inspection, the correlation coefficient is 0.511 for non-claw-free graphs, and 0.643 for claw-free graphs, implying that there is a stronger linear relationship between those two variables for the claw-free graphs than for the non-claw-free graphs. Using a Fisher's z test, the difference is found to be statistically significant with a p-value of 0.0014.

Claw–Free Graphs
Correlation = 0.643

Non–Claw–Free Graphs
Correlation = 0.511
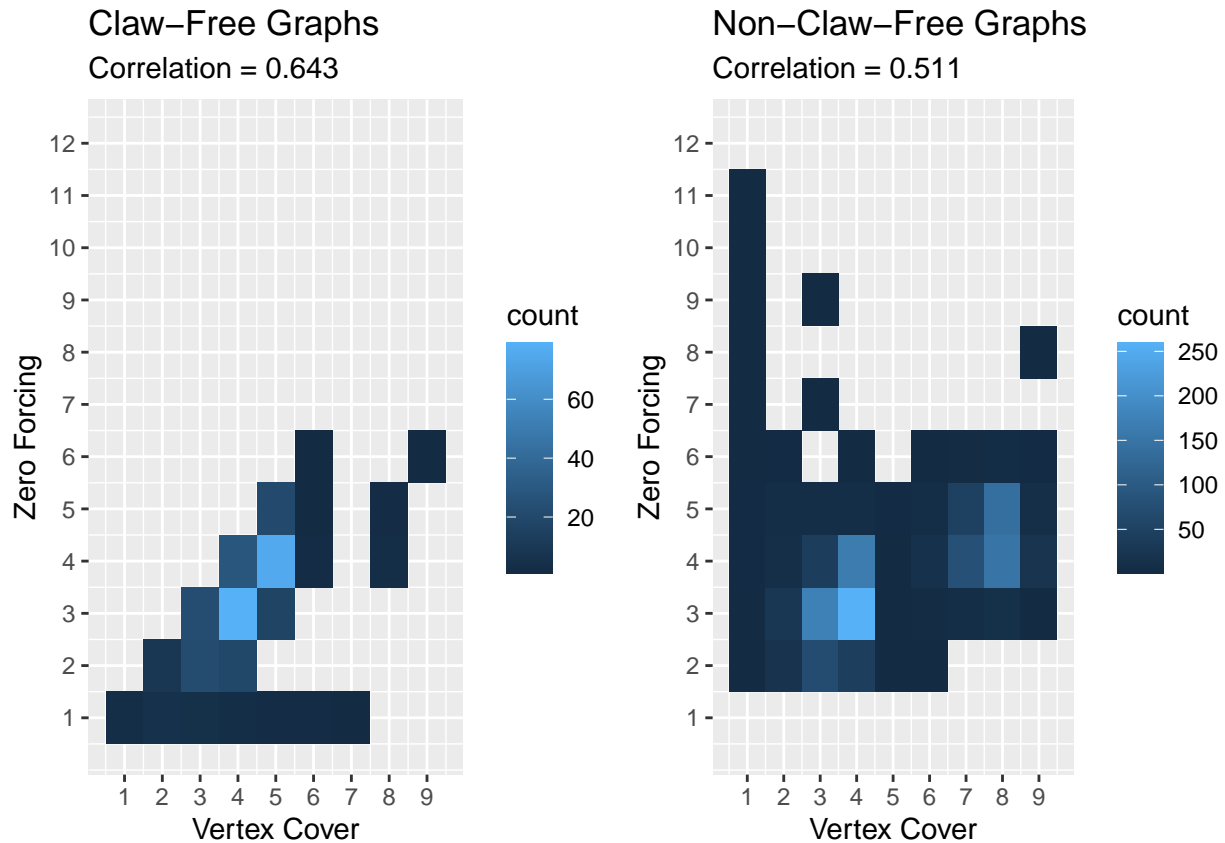
```
##
##   Results of a comparison of two correlations based on independent groups
##
## Comparison between r1.jk (zero_forcing_number, vertex_cover_number) = 0.6425 and r2.hm (zero_forcing,
## Difference: r1.jk - r2.hm = 0.132
## Data: is_cf: j = zero_forcing_number, k = vertex_cover_number; is_ncf: h = zero_forcing_number, m = v
## Group sizes: n1 = 323, n2 = 1372
## Null hypothesis: r1.jk is equal to r2.hm
## Alternative hypothesis: r1.jk is not equal to r2.hm (two-sided)
## Alpha: 0.05
##
## fisher1925: Fisher's z (1925)
##   z = 3.2047, p-value = 0.0014
##   Null hypothesis rejected
##
## zou2007: Zou's (2007) confidence interval
##   95% confidence interval for r1.jk - r2.hm: 0.0532 0.2041
##   Null hypothesis rejected (Interval does not include 0)
```