betaDelta: Staging

Ivan Jacob Agaloos Pesigan

Staging...

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
```

```
BetaDelta(object, type = "mvn")

#> Call:
#> BetaDelta(object = object, type = "mvn")
#>
#> Standardized regression slopes with MVN standard errors:
#>            est     se      t     p   0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> NARTIC  0.4951 0.0759 6.5272 0.000  0.2268 0.2905 0.3421 0.6482 0.6998 0.7635
#> PCTGRT  0.3915 0.0770 5.0824 0.000  0.1190 0.1837 0.2360 0.5469 0.5993 0.6640
#> PCTSUPP 0.2632 0.0747 3.5224 0.001 -0.0011 0.0616 0.1124 0.4141 0.4649 0.5276

BetaDelta(object, type = "adf")

#> Call:
#> BetaDelta(object = object, type = "adf")
#>
#> Standardized regression slopes with ADF standard errors:
#>            est     se      t      p   0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> NARTIC  0.4951 0.0674 7.3490 0.0000  0.2568 0.3134 0.3592 0.6311 0.6769 0.7335
#> PCTGRT  0.3915 0.0710 5.5164 0.0000  0.1404 0.2000 0.2483 0.5347 0.5830 0.6426
#> PCTSUPP 0.2632 0.0769 3.4231 0.0014 -0.0088 0.0558 0.1081 0.4184 0.4707 0.5353
```

References

R Core Team. (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/

$$\beta = \left[\left(\sigma_Y^2\right)^{-1} \operatorname{diag}\left(\Sigma_{X,X}\right)\right]^{\frac{1}{2}} \Sigma_{X,X}^{-1} \sigma_{X,Y} \tag{1}$$

$$\Gamma_{\text{ADF}} = \sigma_{ijgh} - \sigma_{ij}\sigma_{gh} \tag{2}$$

$$\tilde{\Gamma}_{\mathrm{ADF}} = \tilde{\sigma}_{ijgh} - \tilde{\sigma}_{ij}\tilde{\sigma}_{gh} \tag{3}$$

$$\begin{aligned}\hat{\Gamma}_{\mathrm{ADF}} =& \frac{n\,(n-1)}{(n-2)\,(n-3)}\,(\tilde{\sigma}_{ijgh} - \tilde{\sigma}_{ij}\tilde{\sigma}_{gh}) \\ &- \frac{n}{(n-2)\,(n-3)}\left(\tilde{\sigma}_{ik}\tilde{\sigma}_{jl} + \tilde{\sigma}_{il}\tilde{\sigma}_{jk} - \frac{2\tilde{\sigma}_{ij}\tilde{\sigma}_{gh}}{(n-1)}\right)\end{aligned} \tag{4}$$