

$$\text{Simes p-value} = \min_j \frac{n P_{(j)}}{j} = P_S$$

If intersection hypothesis is null then

$$V = \mathbb{R}$$

~~$$P_S \sim U[0,1]$$~~

if $R > 0$ so $\mathbb{P}\left[\frac{V}{R} \geq 1 \mid R > 0\right]$

$$= \mathbb{P}(R > 0) \leq \alpha$$

$$\mathbb{P}(P_S \leq \alpha)$$

So Simes p-value is valid

maybe should change the cut off ??? dependent on the variance?!

Simes value:

why

$$P_1 < P_2$$

$$\min\left(\frac{2P_1}{1}, \frac{2P_2}{2}\right)$$

$$\min(2P_1, P_2)$$