Dear Mariano,

I meet one question when I read the algorithm and code of the calculation of the NES in the viper package.

Based on the slides you sent previously (see the attachment), the expression signature S is transformed into S' after rank transformation and quantile transformation. The ES and NES are calculated based on the signature S'.

My understanding is that the variable s' from the Signature S' follows the standard normal distribution $s' \sim N(0,1)$. The ES is the weighted mean of some s', $ES = \frac{\sum_i w_i s_i'}{\sum_i w_i}$.

Since s' comes from the normal distribution, the weighted s' also follows the normal distribution, $\frac{w_i s}{\sum_i w_i} \sim N(0, \frac{w_i^2}{(\sum_i w_i)^2})$. And the $ES = \frac{\sum_i w_i s_i'}{\sum_i w_i} \sim N(0, \frac{\sum_i w_i^2}{(\sum_i w_i)^2})$. Subsequently, $NES = \frac{ES}{\sqrt{Var(ES)}} = \frac{\frac{\sum_i w_i s_i'}{\sum_i w_i}}{\sqrt{\frac{\sum_i w_i^2}{(\sum_i w_i)^2}}} = \frac{\sum_i w_i s_i'}{\sqrt{\sum_i w_i^2}}$.

The $NES = \frac{\sum_i w_i s_i'}{\sqrt{\sum_i w_i^2}}$, which is the same as the Stouffer integration of the s' associated with the weight w. However, the NES on Page 4 of the slides attached is $NES = \frac{\sum_i w_i s_i'}{\sum_i w_i} \sqrt{\sum_i w_i^2}$.

Thank you for letting me know where is wrong in my above reasoning!

I appreciate your reply very much!

Best wishes,
Junqiang