

A**Enrichment scores (ES)**

Measures of disease-drug similarity

Gene Set Enrichment AnalysisWeighted Signed
Kolmogorov-Smirnov Statistic**CMap 1.0**

Adapted GSEA methods

Disease-drug connectivity scores**CMap 1.0 Connectivity Score (CS)****Reverse Gene Expression Score ($RGES$)****Summarization of Reverse Gene
Expression Score ($sRGES$)****Weighted Connectivity Score (WCS)****Normalized Connectivity Score (NCS)****CMap 2.0 Tau Score (τ)****B** t : treatment instances

ES_{up} & ES_{down}	cs	CS
Same sign	0	0
Different signs	$ES_{up} - ES_{down}$	$cs / \max_t(cs)$, if $cs > 0$ $-cs / \min_t(cs)$, if $cs < 0$

$$RGES = |ES_{up}| - |ES_{down}|$$

$$sRGES = \sum_t^{N_d} (RGES(t) + f(dose(t), time(t))) \times \frac{w(t)}{N_d}$$

ES_{up} & ES_{down}	WCS
Same sign	0
Different signs	$(ES_{up} - ES_{down}) / 2$

$$NCS = \begin{cases} WCS/\mu_{c,dt}^+ & , \text{ if } \text{sign}(WCS) > 0 \\ WCS/\mu_{c,dt}^- & , \text{ otherwise} \end{cases}$$

$$\tau = \text{sign}(NCS) \frac{100}{N_D} \sum_{k=1}^{N_D} [|NCS_k| < |NCS|]$$