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Enrichment scores (ES)
Measures of disease-drug similarity

Gene Set Enrichment Analysis
Weighted 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	$(ES_{up} - ES_{down}) / 2$

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

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