
Algorithm 1 Euclidean Norm Projection onto the l^1 ball of radius t .

input: $v \in \mathbb{R}^n$ and $t > 0$

output: w

- 1 Take absolute value of v $u : u_1 = |v_1|, u_2 = |v_2|, \dots, u_n = |v_n|$
 - 2 Sort u into descending order $\mu : \mu_1 \geq \mu_2 \geq \dots \geq \mu_n$
 - 3 Find $\rho = \max\{j \in 1, \dots, n \mid \mu_j - \frac{1}{j}(\sum_{r=1}^j \mu_r - t) > 0\}$
 - 4 Define $\theta = \frac{1}{\rho}(\sum_{i=1}^{\rho} \mu_i - t)$
 - 5 Output w given by $w_i = \text{sign}(v_i) * \max\{u_i - \theta, 0\}$
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