Algorithm 4: Catabolism

Function `Catabolize`(***S***, $\mathcal{C}$, $\mathcal{B}$, R_{obj}, v_{exp}) **:**

z = maximize v_{exp}

subject to

$\mathbf{S}\cdot\mathbf{v} = 0$

$R_{obj} = 0$

$y_{i,lb} \leq v_i \leq y_{i,ub} \quad \forall i \in \mathcal{C}$

$v_{j,lb} \leq v_j \leq 1000 \quad \forall j \in \mathcal{B}$

if $z \geq 0$ **then**

$\mathbf{z} \leftarrow \mathrm{z}$

for $i \leftarrow 0$ **to** *len*($\mathcal{B}$) **do**

$\hat{z}_i$ = minimize $\mathcal{B}_i$ subject to

$\mathrm{v}_{exp} = \mathbf{z}$

$\mathcal{B}_j = \hat{z}_j \ \ \forall j < i$

$\mathbf{S}\cdot\mathbf{v} = 0$

$R_{obj} = 0$

$y_{i,lb} \leq v_i \leq y_{i,ub} \quad \forall i \in \mathcal{C}$

$v_{j,lb} \leq v_j \leq 1000 \quad \forall j \in \mathcal{B}$

else

return failure

return 0, **v**