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**Algorithm 3: Primary Production**

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**Function** Primary Production ( $\mathbf{S}, \mathcal{C}, \mathcal{B}, \mathcal{B}_T, v_{exp}, v_{fix}, R_{obj}$ ) :

```
z = maximize  $v_{exp}$ 
subject to
   $\mathbf{S} \cdot \mathbf{v} = 0$     $R_{obj} = 0$ 
   $y_{i,lb} \leq v_i \leq y_{i,ub} \quad \forall i \in \mathcal{C}$ 
   $0 \leq v_j \leq 1000 \quad \forall j \in \mathcal{B}$ 
if  $z \geq 0$  then
  |  $\mathbf{z} \leftarrow \mathbf{z}$ 
else
  z = maximize  $v_{exp}$ 
  subject to
     $\mathbf{S} \cdot \mathbf{v} = 0$ 
     $R_{obj} = 0$ 
     $y_{i,lb} \leq v_i \leq y_{i,ub} \quad \forall i \in \mathcal{C}$ 
     $0 \leq v_j \leq 1000 \quad \forall j \in \mathcal{B} \setminus \mathcal{B}_T$ 
  if  $z \geq 0$  then
  |  $\mathbf{z} \leftarrow \mathbf{z}$ 
  else
    z = maximize  $v_{fix}$ 
    subject to
       $\mathbf{S} \cdot \mathbf{v} = 0$ 
       $R_{obj} = 0$ 
       $y_{i,lb} \leq v_i \leq y_{i,ub} \quad \forall i \in \mathcal{C}$ 
       $0 \leq v_j \leq 1000 \quad \forall j \in \mathcal{B}$ 
    if  $z \geq 0$  then
    |  $\mathbf{z} \leftarrow \mathbf{z}$ 
    else
      return failure
```

**return** 0,  $\mathbf{v}$

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