

### 3) Lemma 1

Samstag, 26. Juni 2021

14:16

- Deletion can only occur if  $m \equiv 0 \pmod w$  according to the algorithm
- So we can assume  $m = c \cdot w$  for  $c \in \mathbb{N}_0$
- Since  $w$  is the bucket size, the  $m$  stream items that were observed can be split up into  $c$  different buckets
- $b_{\text{current}}$  is initially 1 and always incremented by 1 if  $m \equiv 0 \pmod w$  happens  
 $\Rightarrow c = b_{\text{current}}$

$$\Rightarrow b_{\text{current}} \leq \varepsilon m$$

$$= \varepsilon \cdot c \cdot w$$

$$= b_{\text{current}} \underbrace{\varepsilon \cdot \left\lceil \frac{1}{\varepsilon} \right\rceil}_{\geq 1} \checkmark$$