$w^w = g(a_t) + (1-g)(c)$

if g^w

if update

$w^w = c^w$

else if new

$w^w = a_t$

end

end

algorithm

$p_t = (1 - \sum w^w)\, p_{t-1} + w^w$

p = previously written address

if writing == 1

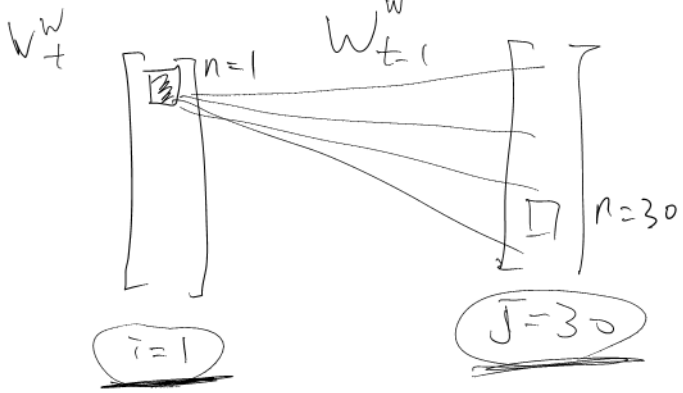
$p_t = w_t^w$

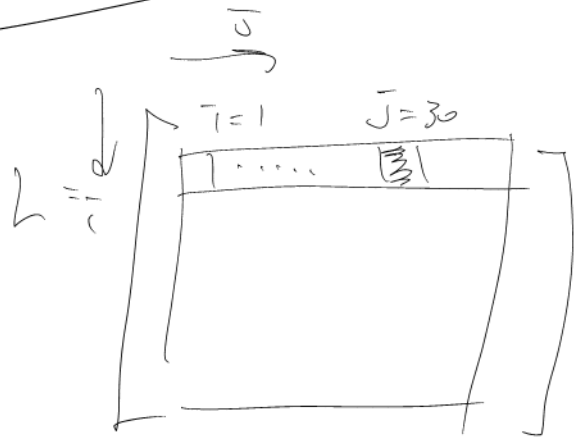
else

$p_t = p_{t-1}$

end

algorithm

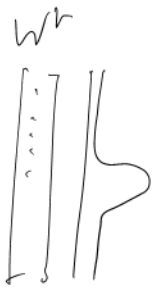




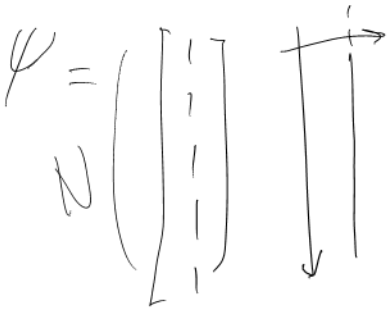
$\psi = 1 - f\, w^r_{t-1}$

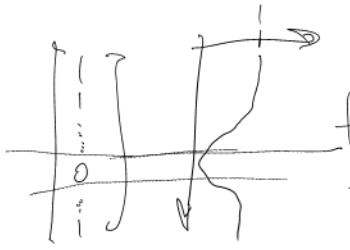
$\psi = 0 \rightarrow$ delete

$f = 1 \rightarrow$ forget

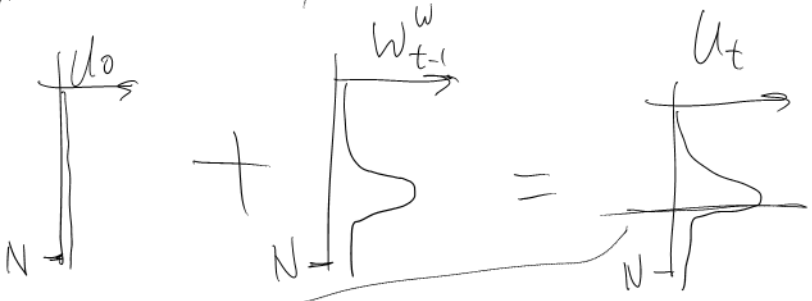


when $f = 0$

$\psi =$ 

when $f = 1$ $\psi =$ 

$u = 0$ Initially



meaning this address is just written. don't delete

$u_t = u_{t-1} + w^w_{t+1} - u_{t-1} w^w_{t-1}$

just to prevent redundant addition

$M = M - NW_e + W_V$ Memory Write

$$N\begin{bmatrix}\equiv\\ \equiv\\ \equiv\\ \equiv\end{bmatrix}_{W} = N\begin{bmatrix}\ \\ \ \\ \ \end{bmatrix}_{W} - N\begin{bmatrix}\ \\ \ \\ \ \end{bmatrix}_{W}\begin{bmatrix}\ \\ \ \\ \ \end{bmatrix}_{Nx1}\begin{bmatrix} e \end{bmatrix}_{Wx1}$$

$W^w e =$ W^w → 10 ↓ × e [1 0 1 0 1 0 ⋯⋯] 1 = delete, 0 = leave

N [0000⋯ / 000⋯ / ⋮ / 000000 / 10101⋯ / 000000 / ⋮] = 10 → M

$\odot M$ ↳ element wise production

* Cell and element level Clear

$W^W V$ is similar to above

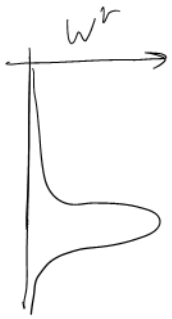
M [⋮ / 1 ← M_{10}] → want to delete

W^r → 10 ↓ n

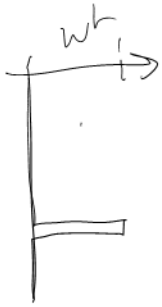
$e = [0\ 0\ 1\ 0]$

$r = M^T w^r$

$r = w \left(\left[\; | \; | \; | \; | \; | \; \right]_{M^T} \right) \begin{bmatrix} \\ \\ \\ \end{bmatrix}_{N \times 1}$ w^r



interpolation



one-hot