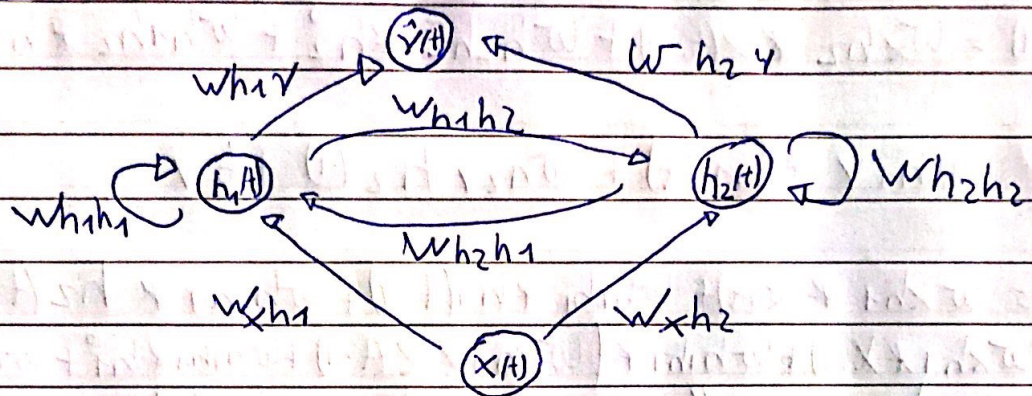


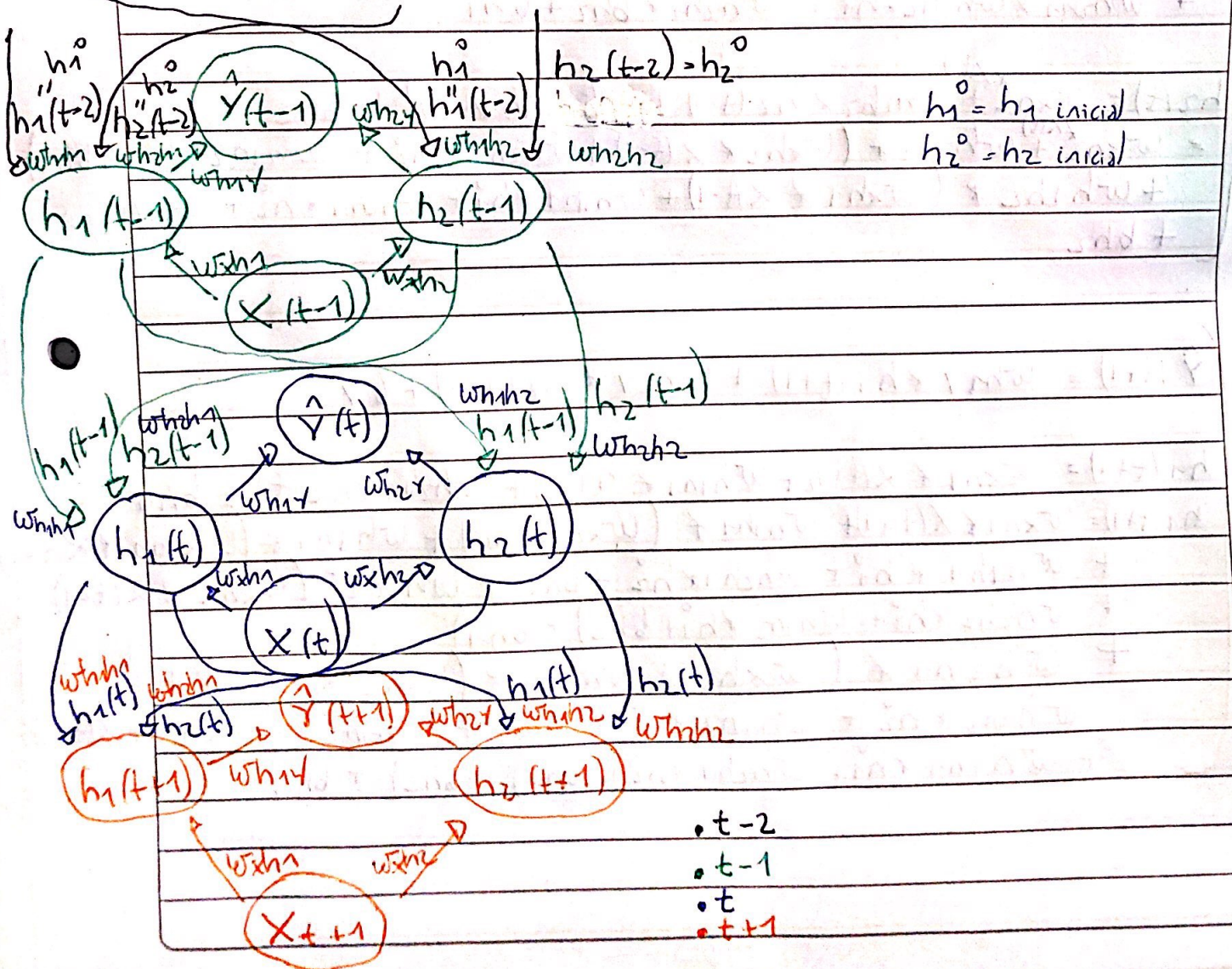
### Ejercicio 3



$$\hat{y}(t) = w_{h1y} * h_1(t) + w_{h2y} * h_2(t) + b_y$$

$$h_1(t) = w_{xh1} * x(t) + w_{h1h1} * h_1(t-1) + w_{h2h1} * h_2(t-1) + b_{h1}$$

$$h_2(t) = w_{xh2} * x(t) + w_{h2h2} * h_2(t-1) + w_{h1h2} * h_1(t-1) + b_{h2}$$





$$\hat{y}(t-1) = w_{h1y} * h_1(t-1) + w_{h2y} * h_2(t-1) + b_y$$

$$h_1(t-1) = w_{xh1} * x(t-1) + w_{h1h1} * h_1^0 + w_{h2h1} * h_2^0 + b_{h1}$$

$$h_2(t-1) = w_{xh2} * x(t-1) + w_{h2h2} * h_2^0 + w_{h1h2} * h_1^0 + b_{h2}$$

$$\hat{y}(t) = w_{h1y} * h_1(t) + w_{h2y} * h_2(t) + b_y$$

$$h_1(t) = w_{xh1} * x(t) + w_{h1h1} * h_1(t-1) + w_{h2h1} * h_2(t-1) + b_{h1}$$

$$h_1(t) = w_{xh1} * x(t) + w_{h1h1} * (w_{xh1} * x(t-1) + w_{h1h1} * h_1^0 + w_{h2h1} * h_2^0 + b_{h1}) + w_{h2h1} * (w_{xh2} * x(t-1) + w_{h2h2} * h_2^0 + w_{h1h2} * h_1^0 + b_{h2}) + b_{h1}$$

$$= w_{xh1} * x(t) + w_{h1h1} * w_{xh1} * x(t-1) + w_{h1h1}^2 * h_1^0 + w_{h1h1} * w_{h2h1} * h_2^0 + w_{h1h1} * b_{h1} + w_{h2h1} * w_{xh2} * x(t-1) + w_{h2h1} * w_{h2h2} * h_2^0 + w_{h2h1} * w_{h1h2} * h_1^0 + w_{h2h1} * b_{h2} + b_{h1}$$

$$h_2(t) = w_{xh2} * x(t) + w_{h2h2} * h_2(t-1) + w_{h1h2} * h_1(t-1) + b_{h2}$$

$$= w_{xh2} * x(t) + w_{h2h2} * (w_{xh2} * x(t-1) + w_{h2h2} * h_2^0 + w_{h1h2} * h_1^0 + b_{h2}) + w_{h1h2} * (w_{xh1} * x(t-1) + w_{h1h1} * h_1^0 + w_{h2h1} * h_2^0 + b_{h1}) + b_{h2}$$

$$\hat{y}(t+1) = w_{h1y} * h_1(t+1) + w_{h2y} * h_2(t+1) + b_y$$

$$h_1(t+1) = w_{xh1} * x(t+1) + w_{h1h1} * h_1(t) + w_{h2h1} * h_2(t) + b_{h1}$$

$$h_1(t+1) = w_{xh1} * x(t+1) + w_{h1h1} * (w_{xh1} * x(t) + w_{h1h1} * (w_{xh1} * x(t-1) + w_{h1h1} * h_1^0 + w_{h2h1} * h_2^0 + b_{h1}) + w_{h2h1} * (w_{xh2} * x(t-1) + w_{h2h2} * h_2^0 + w_{h1h2} * h_1^0 + b_{h2}) + b_{h1}) + w_{h2h1} * (w_{xh2} * x(t) + w_{h2h2} * h_2(t) + w_{h1h2} * h_1(t) + b_{h2}) + b_{h1}$$



$$h_2(t+1) = w_{xh_2} * x_{t+1} + w_{h_2h_2} * h_2(t) + w_{h_1h_2} * h_1(t) + b_{h_2}$$

$t+1$

$$h_2(t+1) = w_{xh_2} * x(t+1) + w_{h_2h_2} * [w_{xh_2} * x(t) + w_{h_2h_2} * h_2(t) + w_{h_1h_2} * h_1(t) + b_{h_2}] + w_{h_1h_2} * [w_{xh_1} * x(t) + w_{h_2h_1} * h_2(t) + w_{h_1h_1} * h_1(t) + b_{h_1}] + b_{h_2}$$