FYS-STK3155/4155, Lecture November 17

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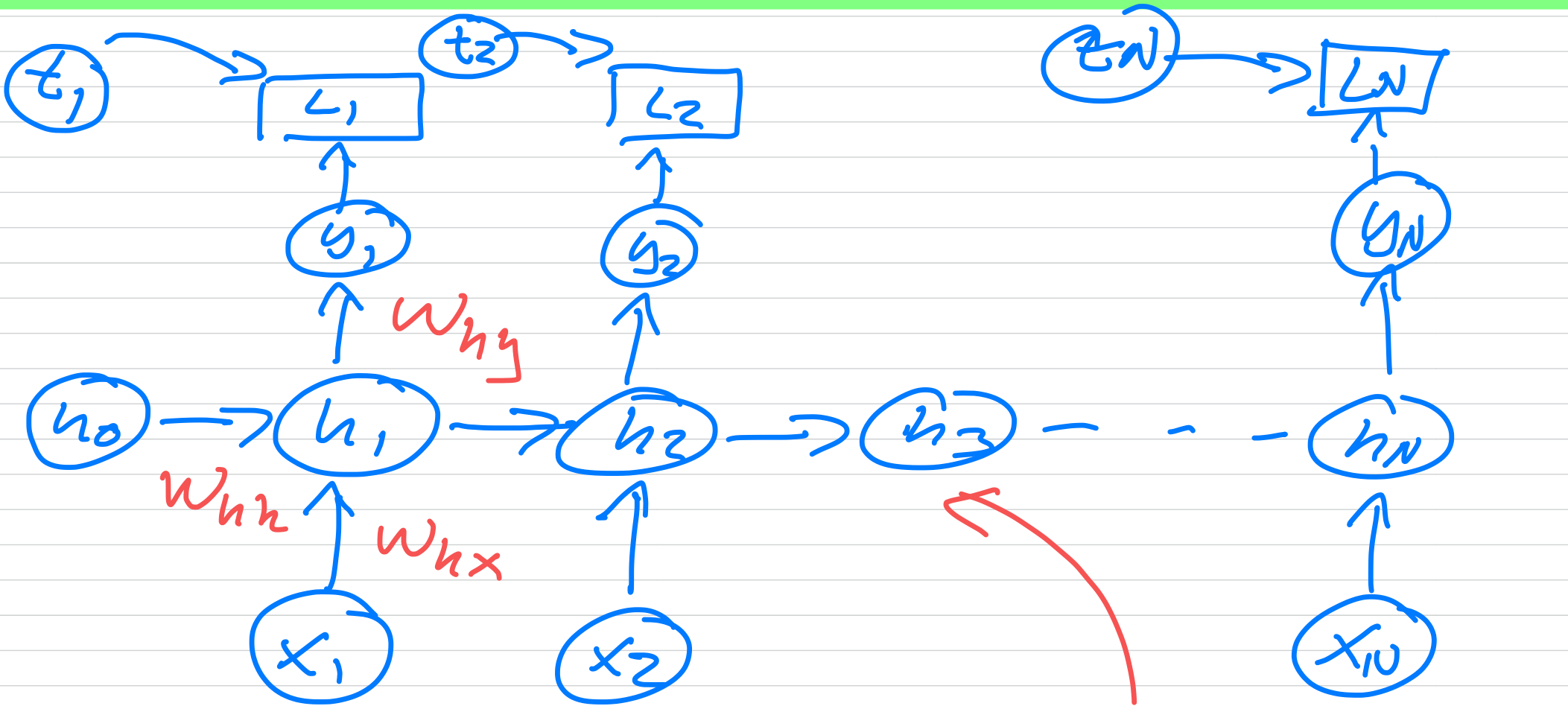


$$C = \sum_{i=1}^{N} \mathcal{L}(y_i, t_i)$$

Sliding window of length sequence_length

Given a time series

$[x_0, x_1, x_2, \ldots x_T]$

sequence_length = 3

$[x_0, x_1, x_2]$

$[x_1, x_2, x_3]$

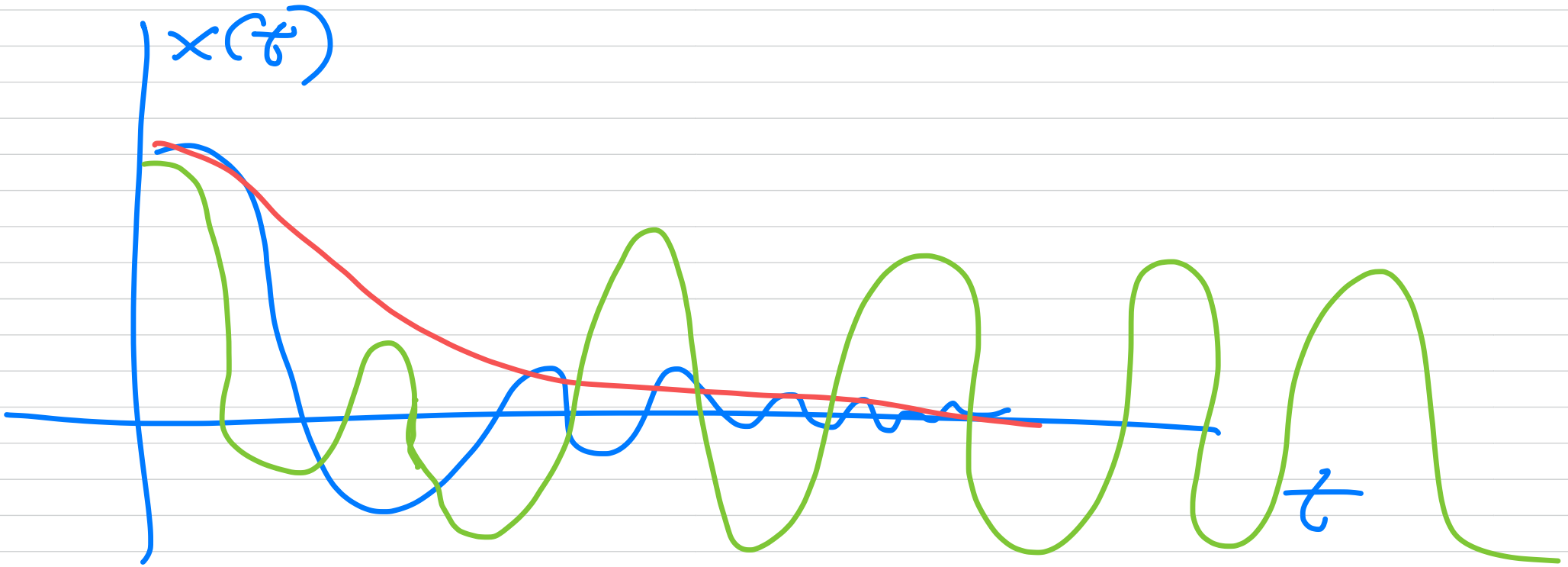
$[x_2, x_3, x_4]$

⋮

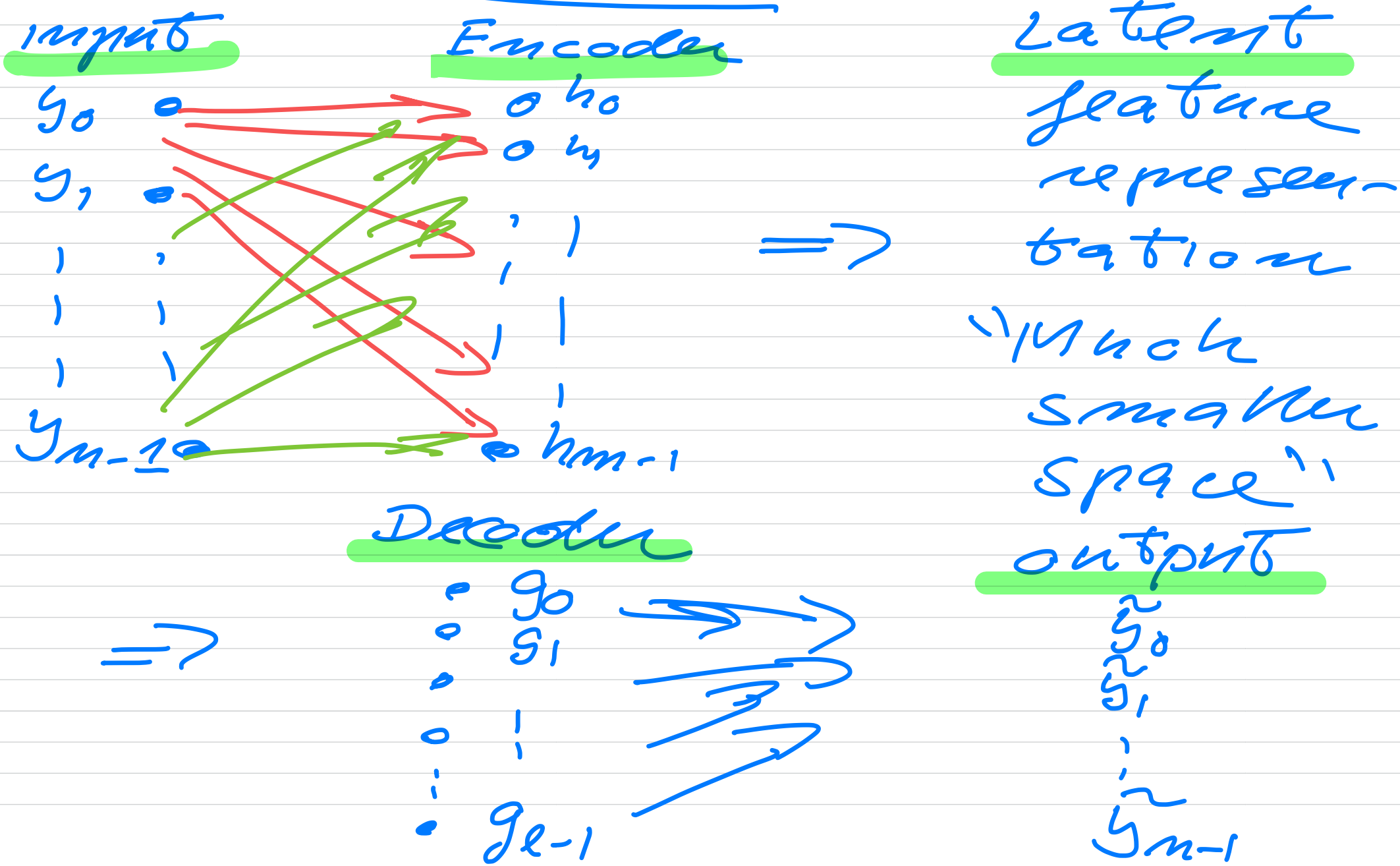
each window is an input sequence to a RNN

$$m\frac{d^2x}{dt^2} + \eta\frac{dx}{dt} + x(t) = F(t)$$

$$F(t) = 0$$



Auto encoders



$$h = f(W, y) \qquad \text{(encoder)}$$

$$\tilde{y} = g(V, h) \qquad \text{(decoder)}$$

$$MSE = \frac{1}{n} \sum_{i=0}^{n-1} (y_i - \tilde{y}_i)^2$$

optimization

$$\hat{V}, \hat{W} = \underset{V, W}{\arg\min} \frac{1}{n} \sum_{i=0}^{n-1} (y_i - \tilde{y}_i)^2$$

Suppose a linear model

$$h = W \cdot y \qquad g = V \cdot h$$

$$\hat{g} = V \cdot W \cdot y$$

$$\hat{V}, \hat{W} = \underset{V,W}{\operatorname{argmin}} \frac{1}{n} \sum_i \left[(1 - VW) y \right]^2$$