Sequence Modeling: Recurrent and Recursive Nets

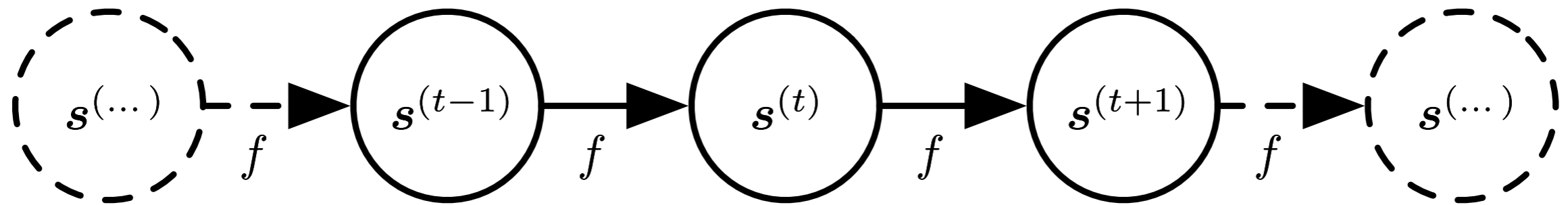# Classical Dynamical Systems

Figure 10.1
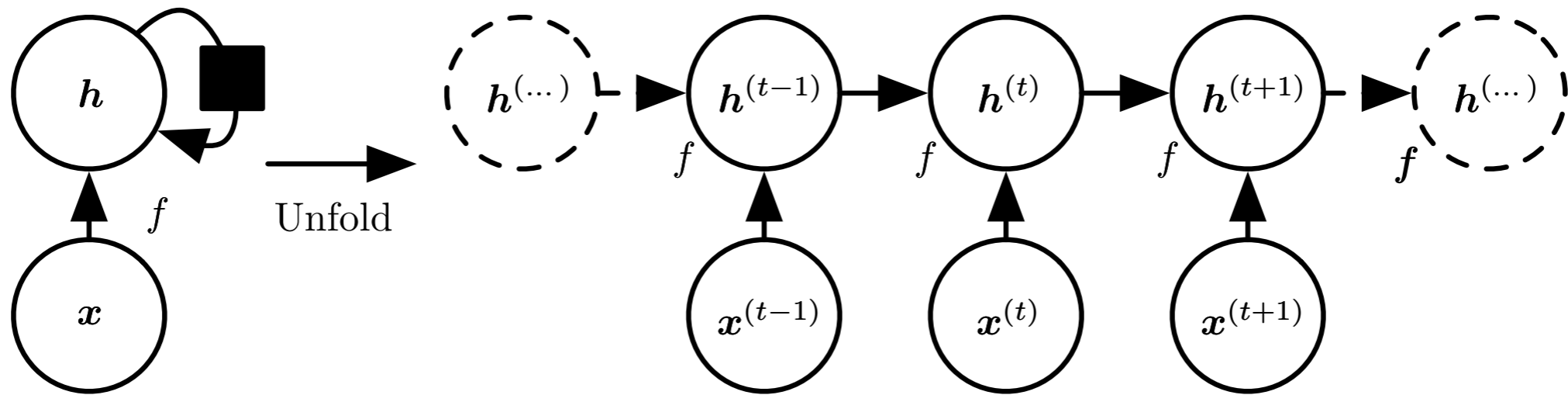
Unfolding Computation Graphs

Figure 10.2

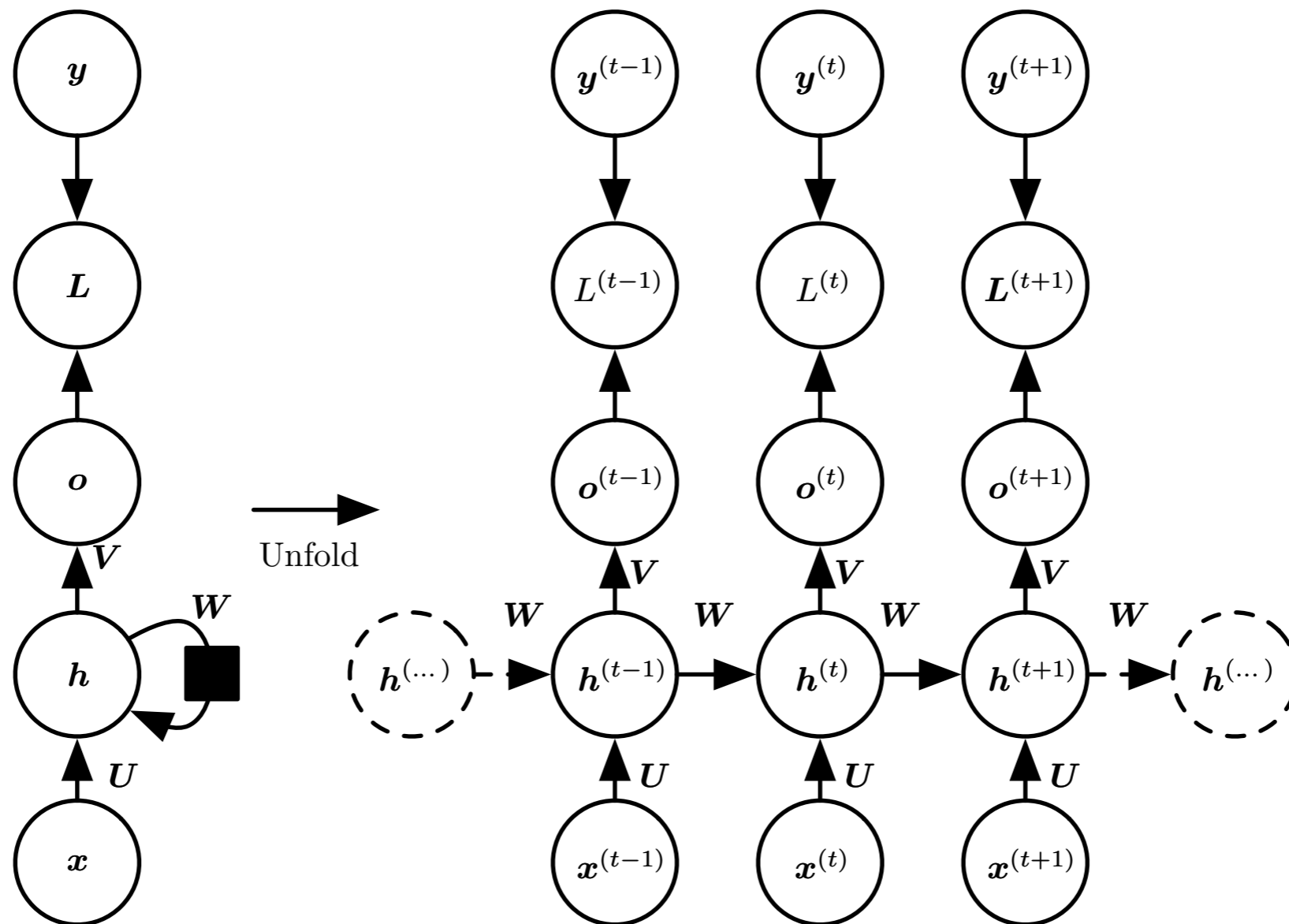# Recurrent Hidden Units

Figure 10.3

Recurrence through only the Output

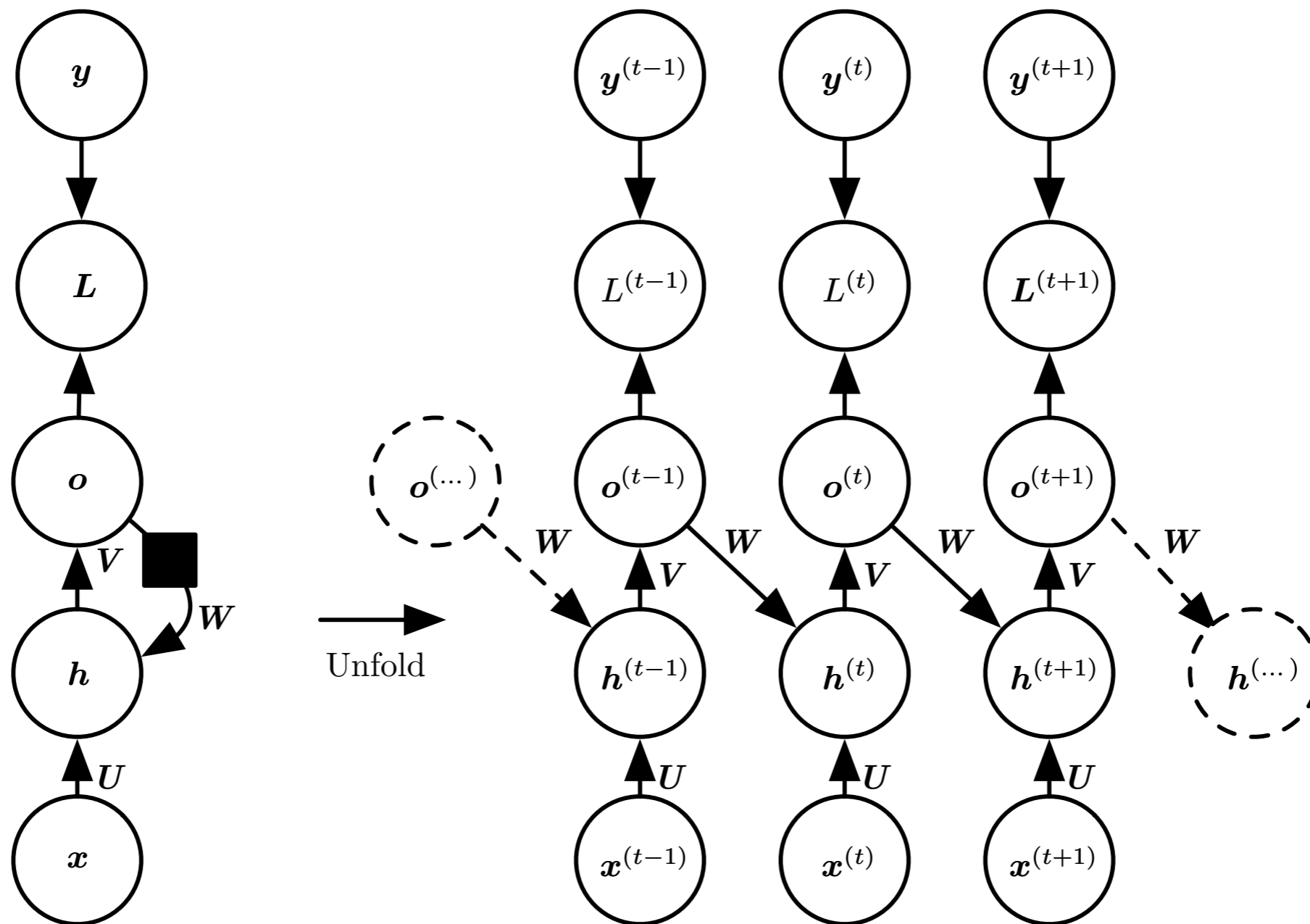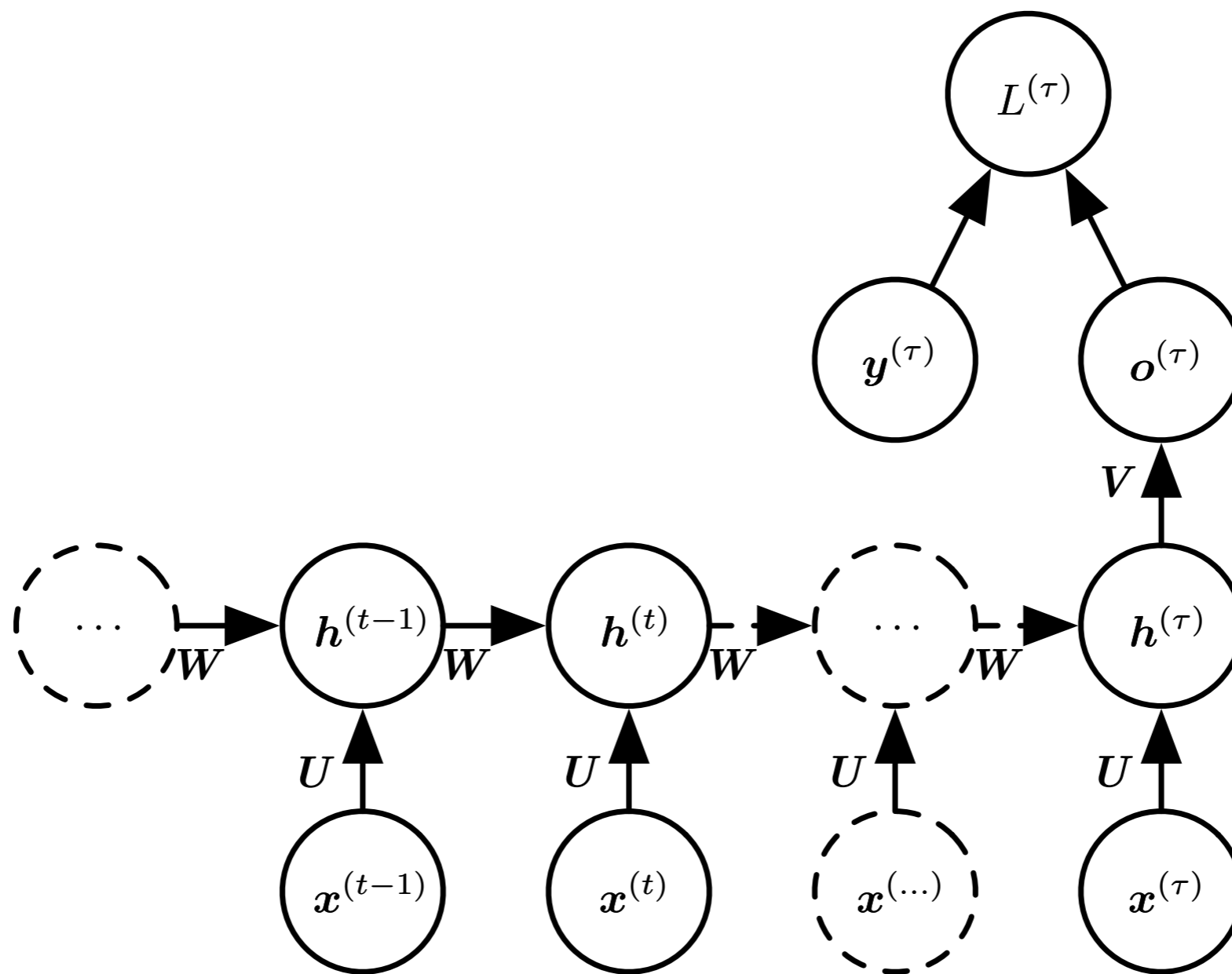Figure 10.4

Sequence Input, Single Output

Figure 10.5

Teacher Forcing

Train time

Test time

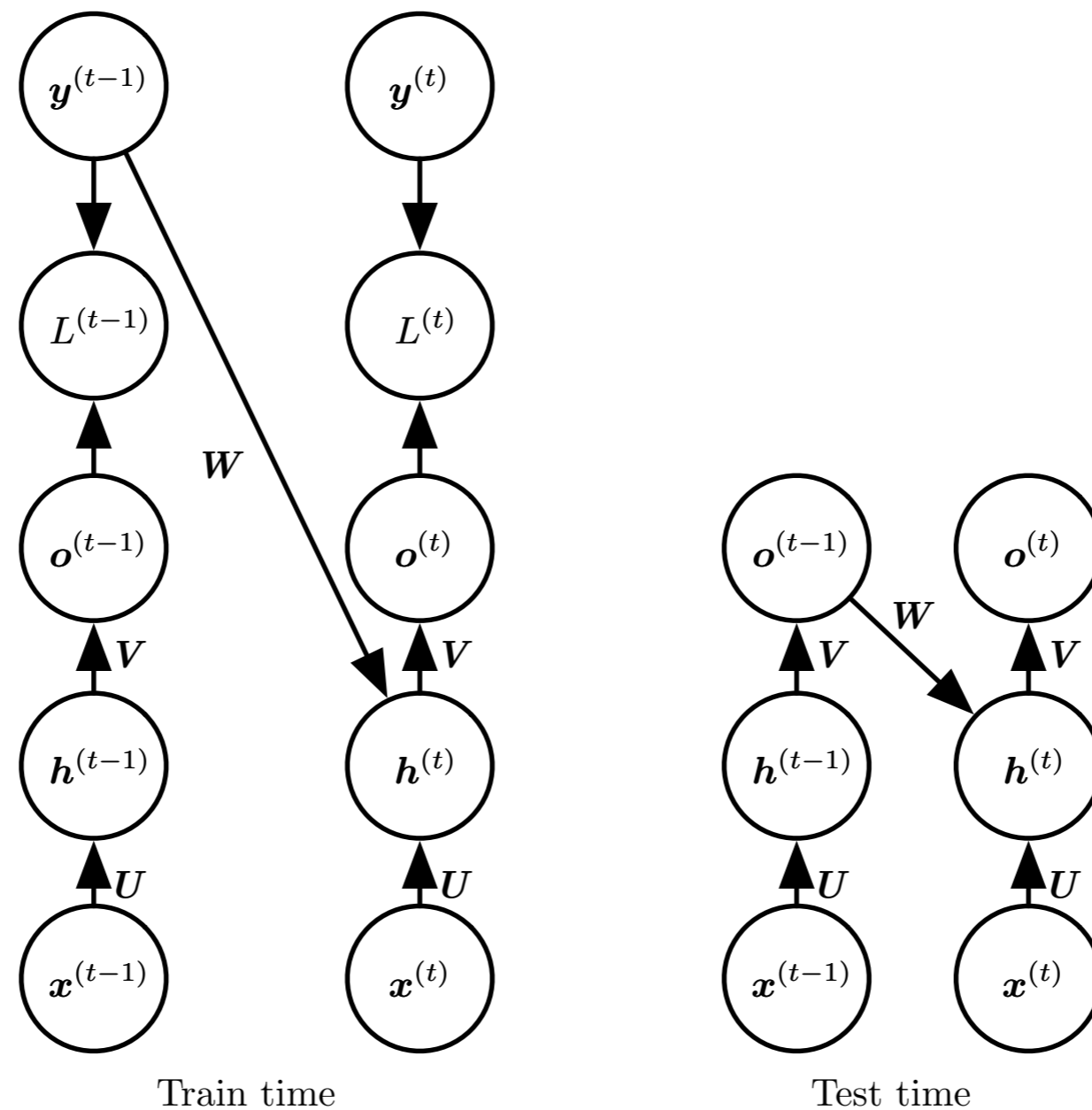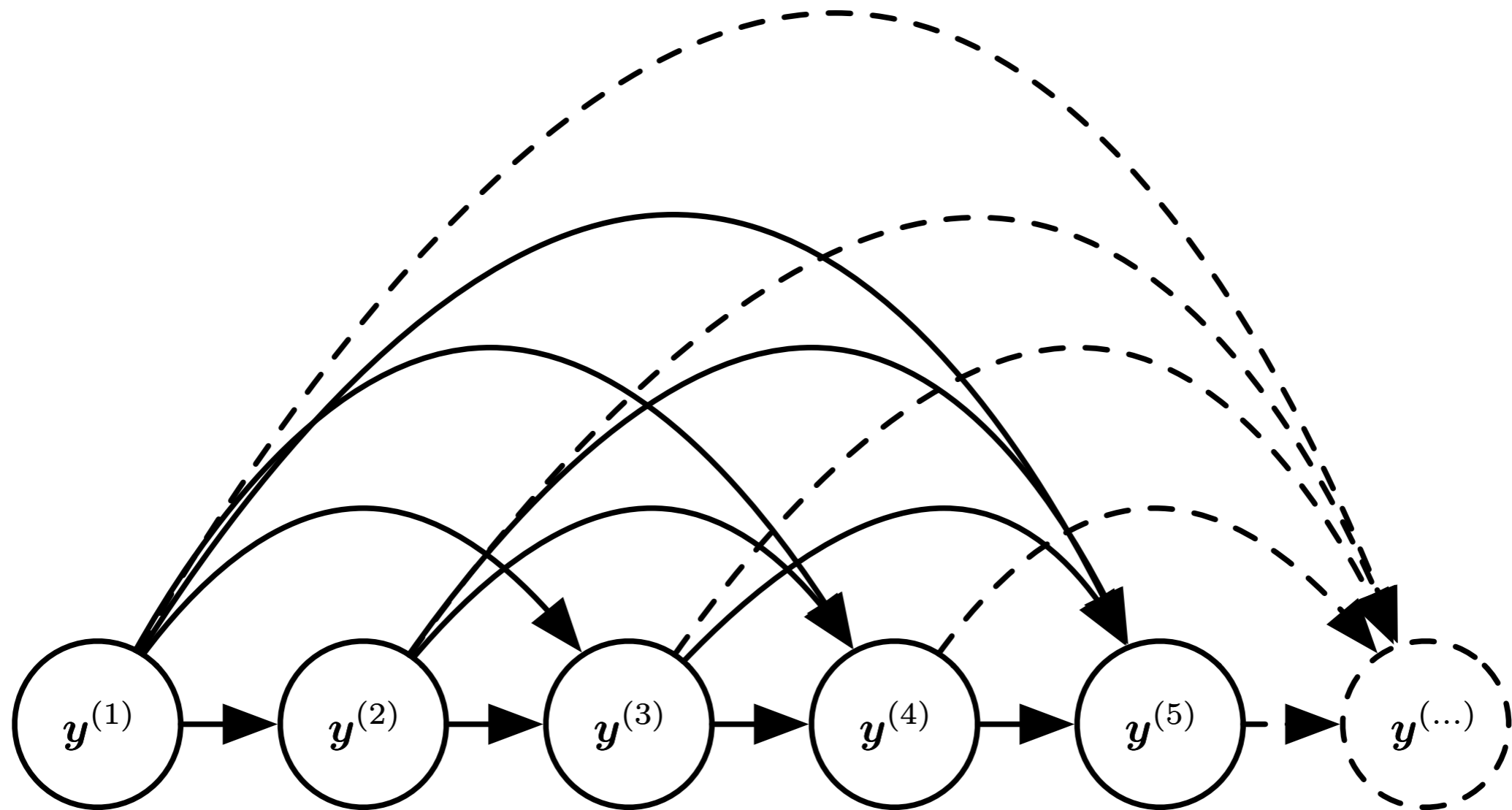Figure 10.6

Fully Connected Graphical Model
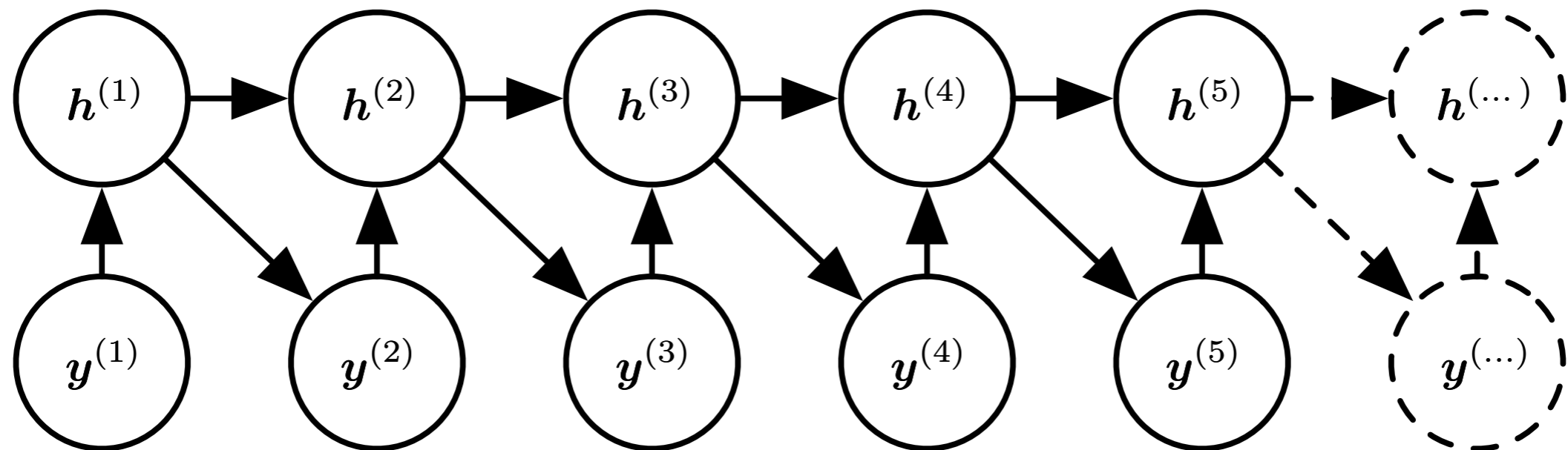

Figure 10.7

Figure 10.8

(The conditional distributions for the
hidden units are deterministic)
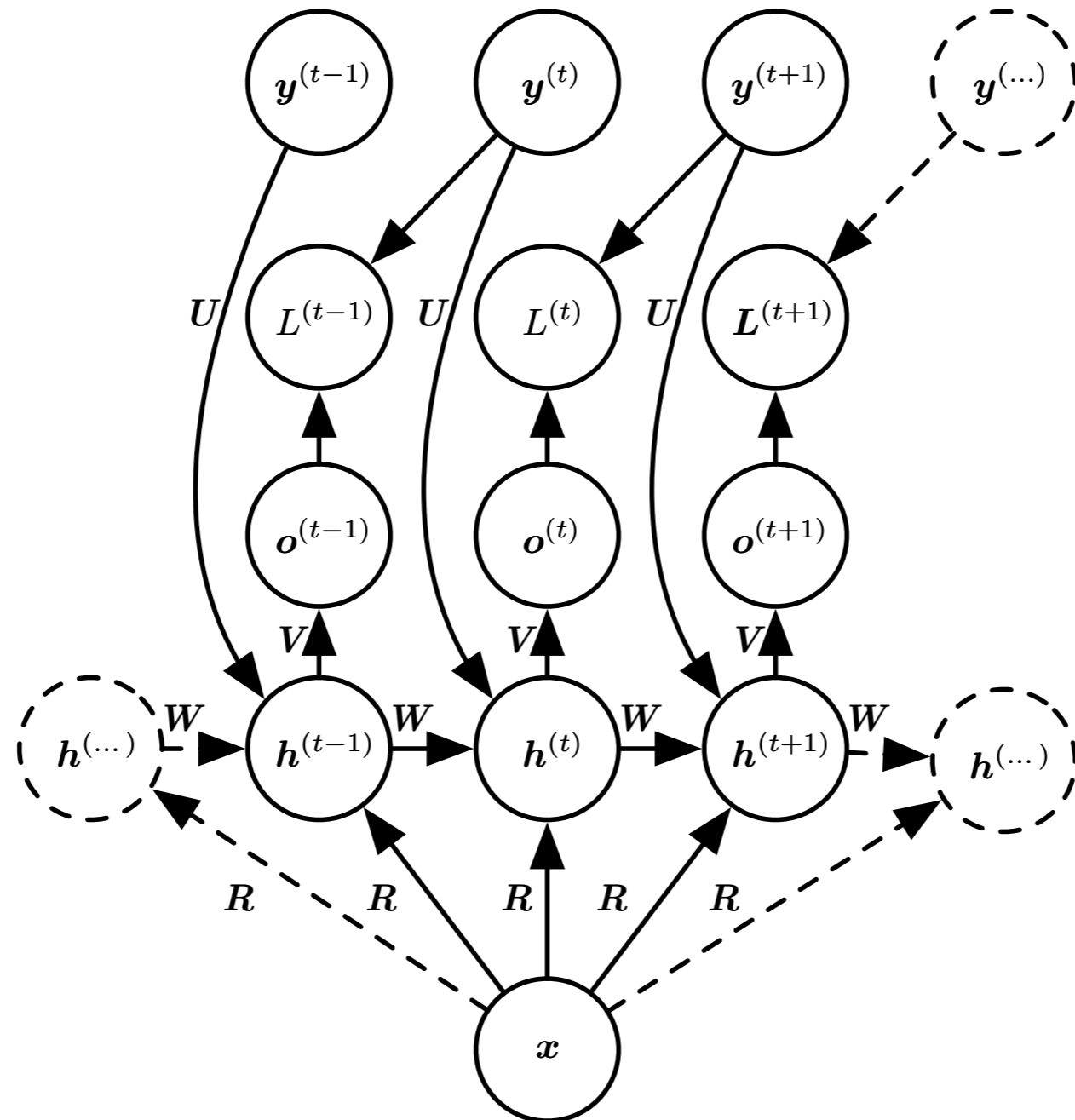
Vector to Sequence

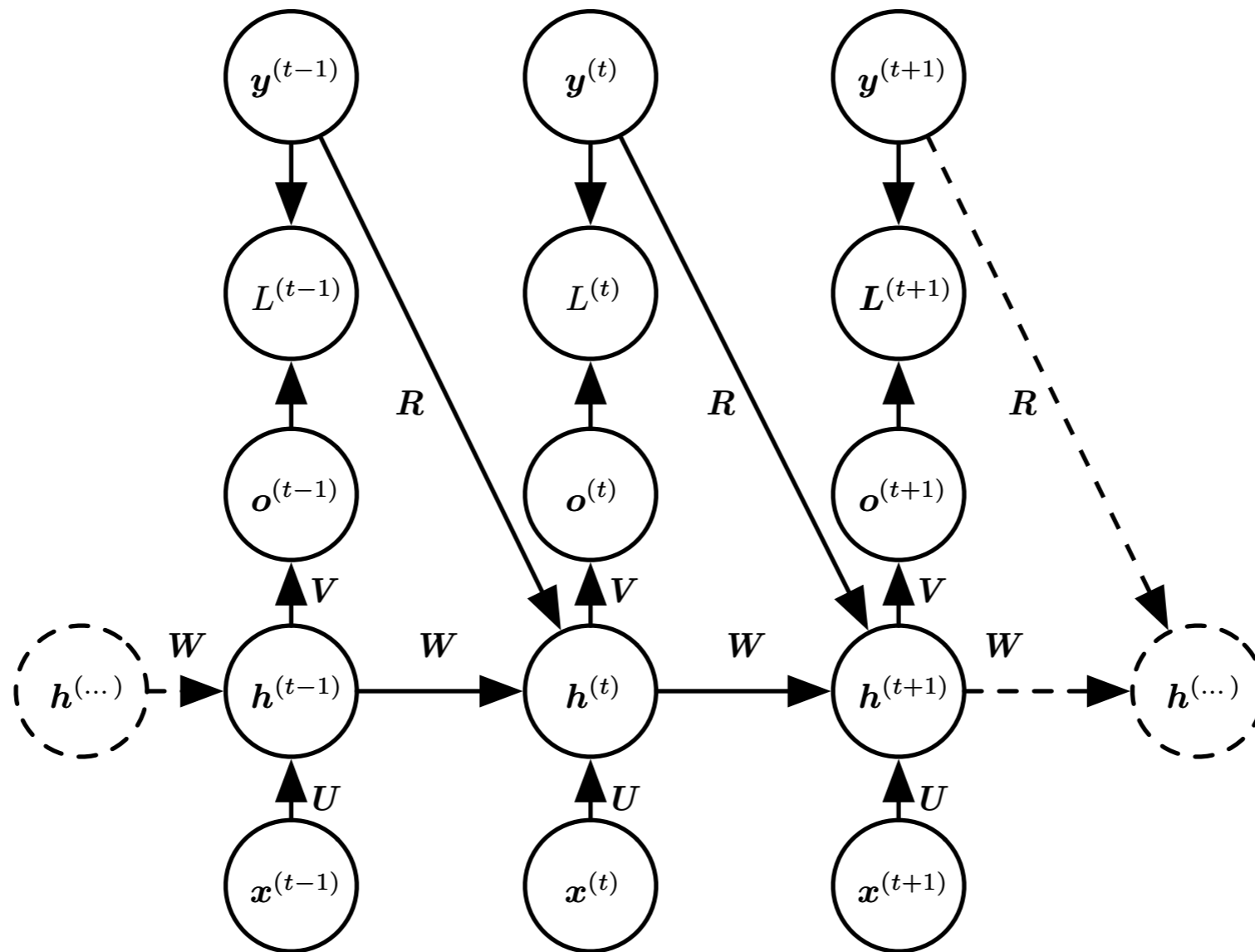Figure 10.9

Hidden and Output Recurrence

Figure 10.10

The output values are not forced to be conditionally independent in this model.
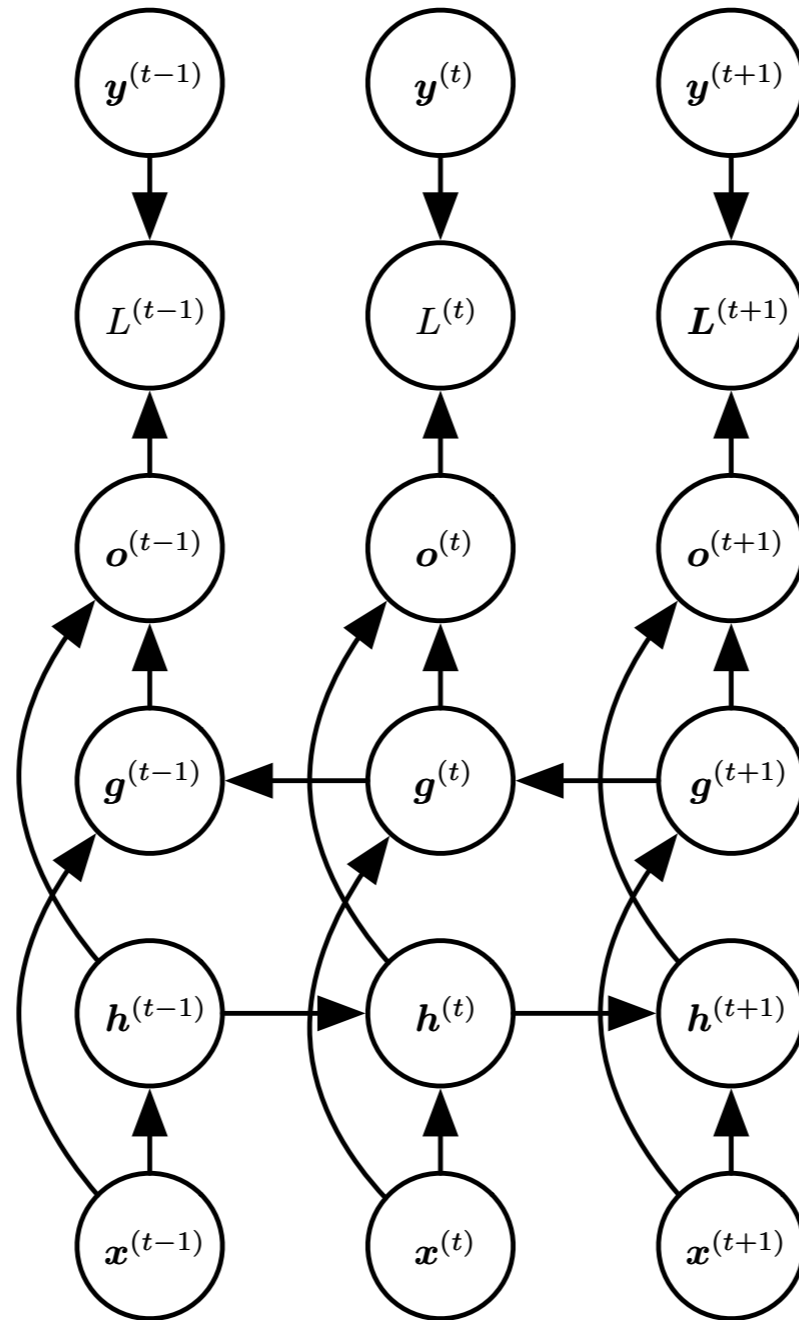
Bidirectional RNN

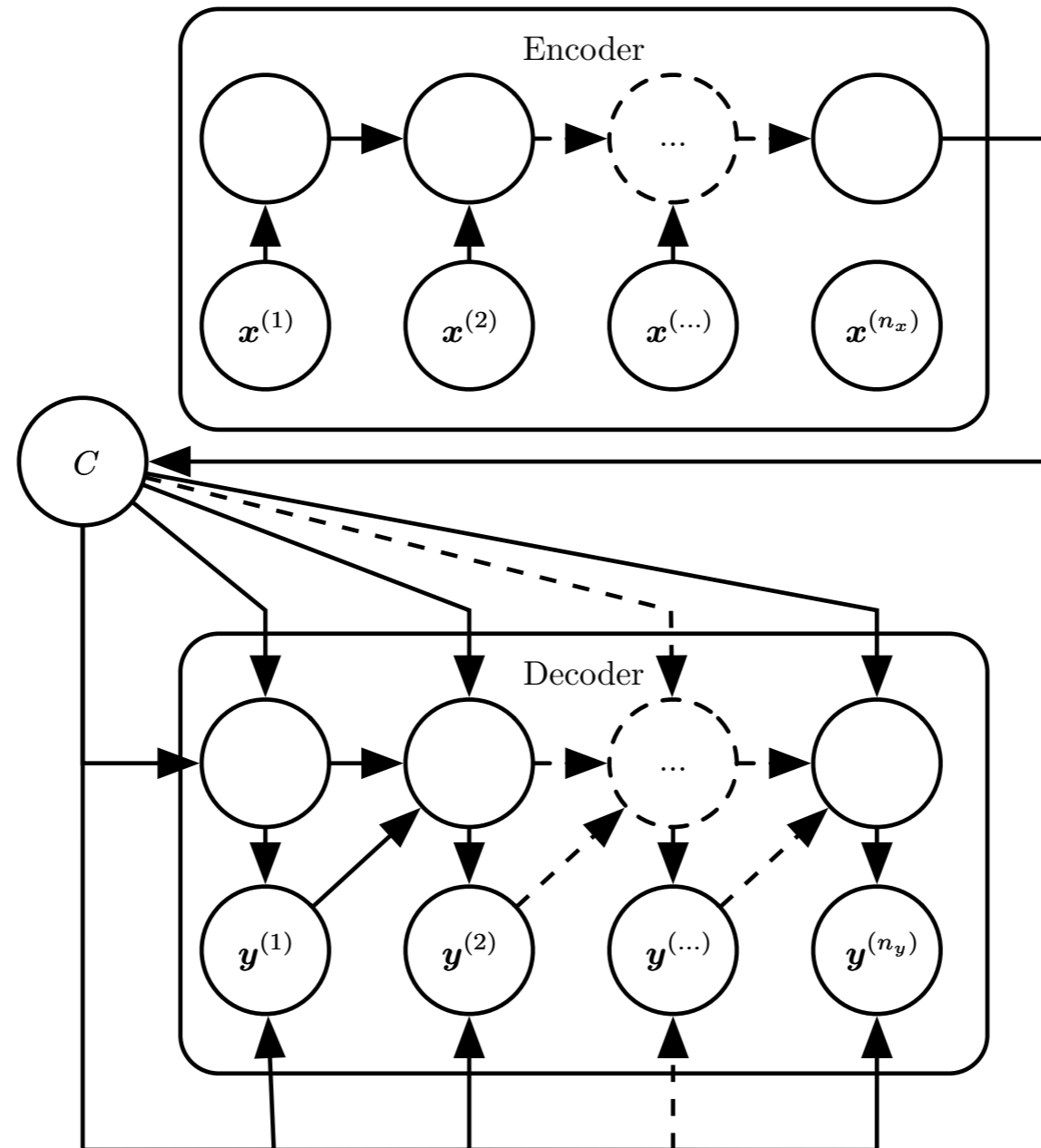Figure 10.11

Sequence to Sequence Architecture

Figure 10.12

Deep RNNs

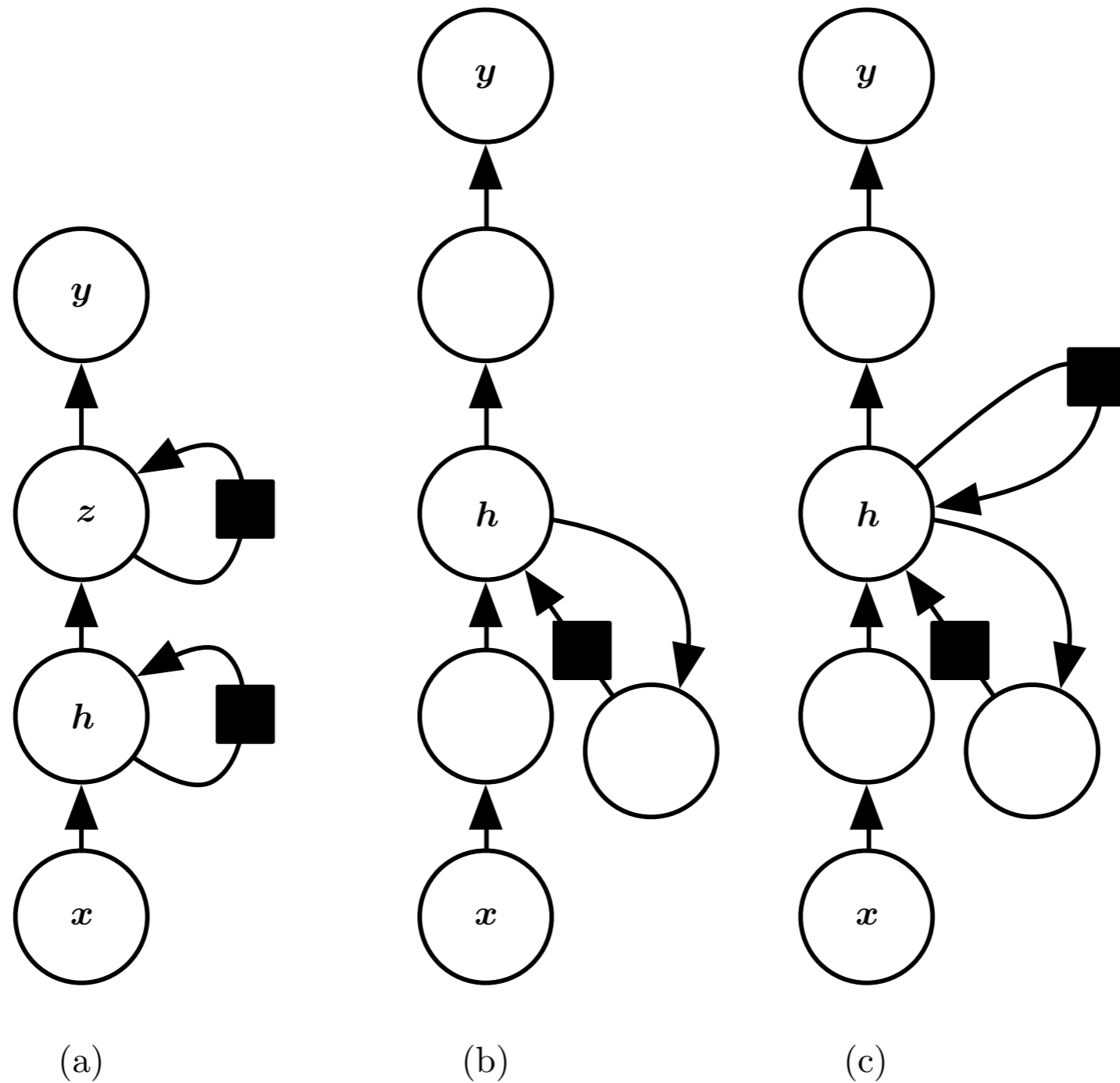(a)   (b)   (c)

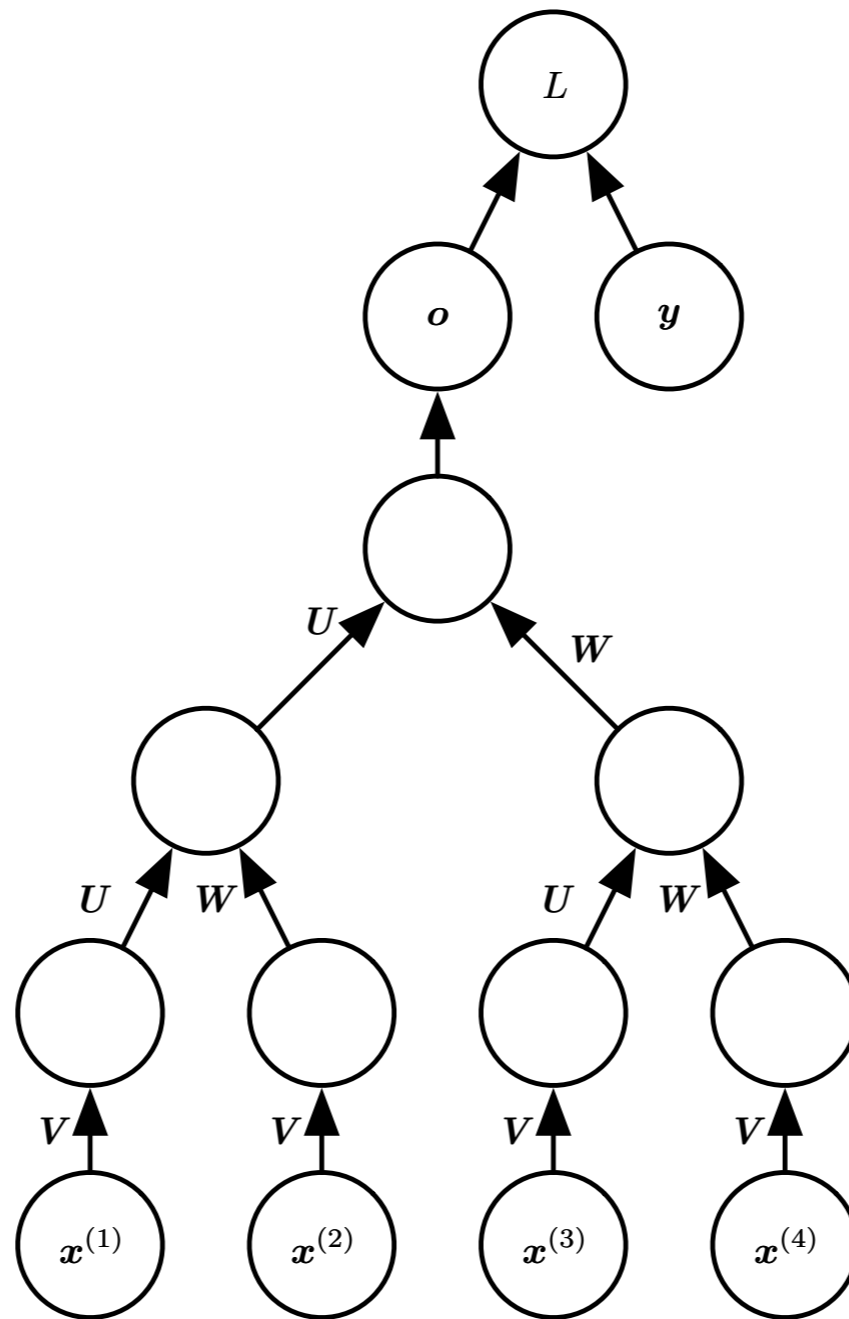Figure 10.13

Recursive Network

Figure 10.14

Exploding Gradients from Function Composition

Figure 10.15

LSTM

output

self-loop

state

input   input gate   forget gate   output gate
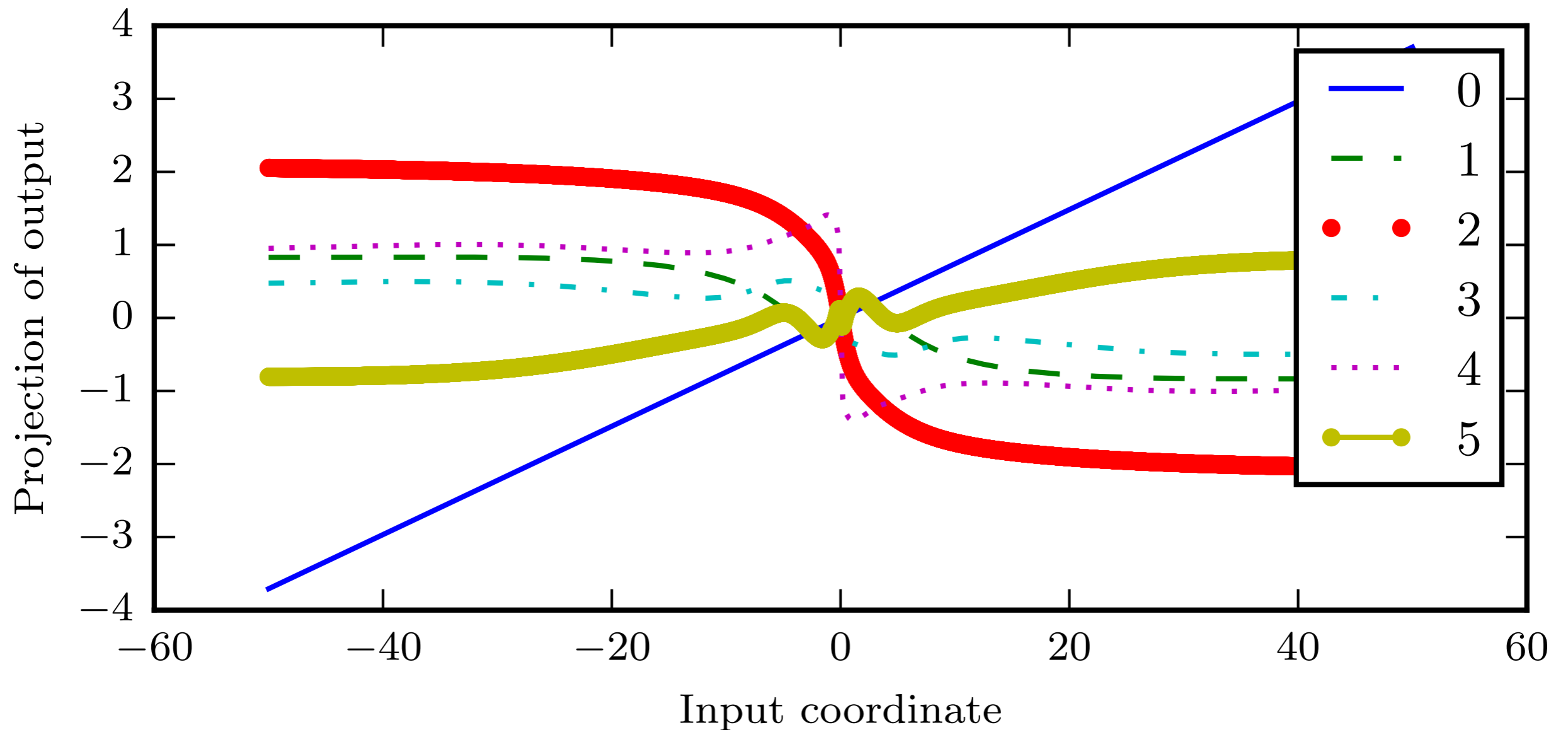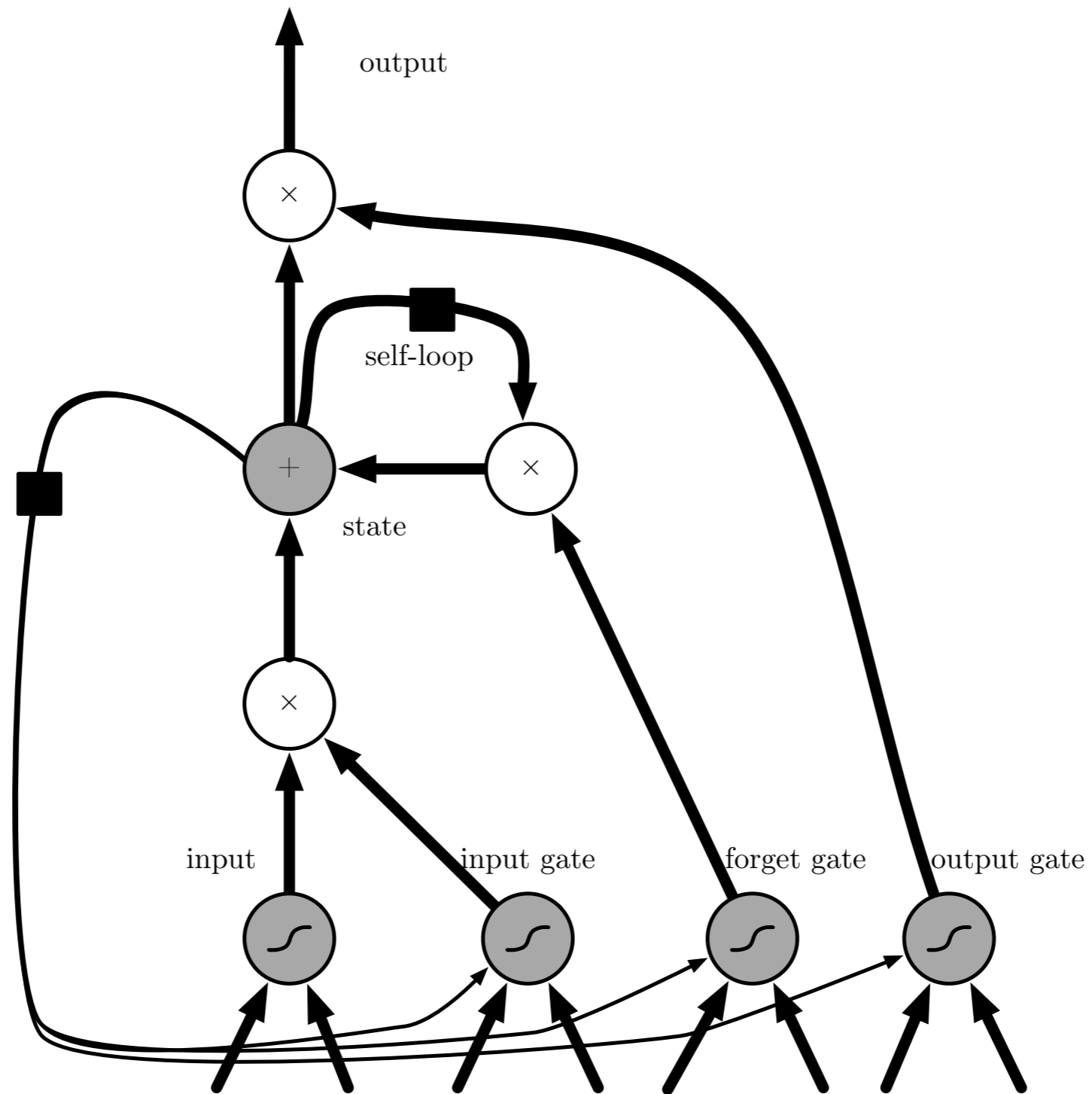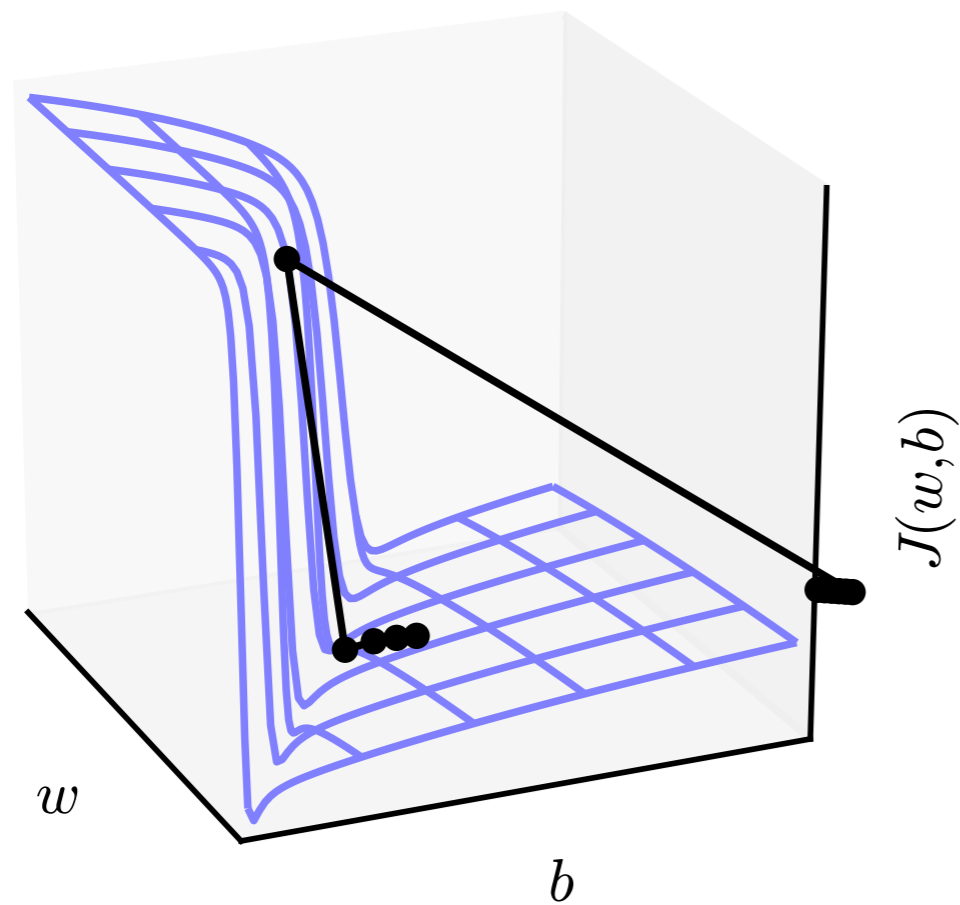
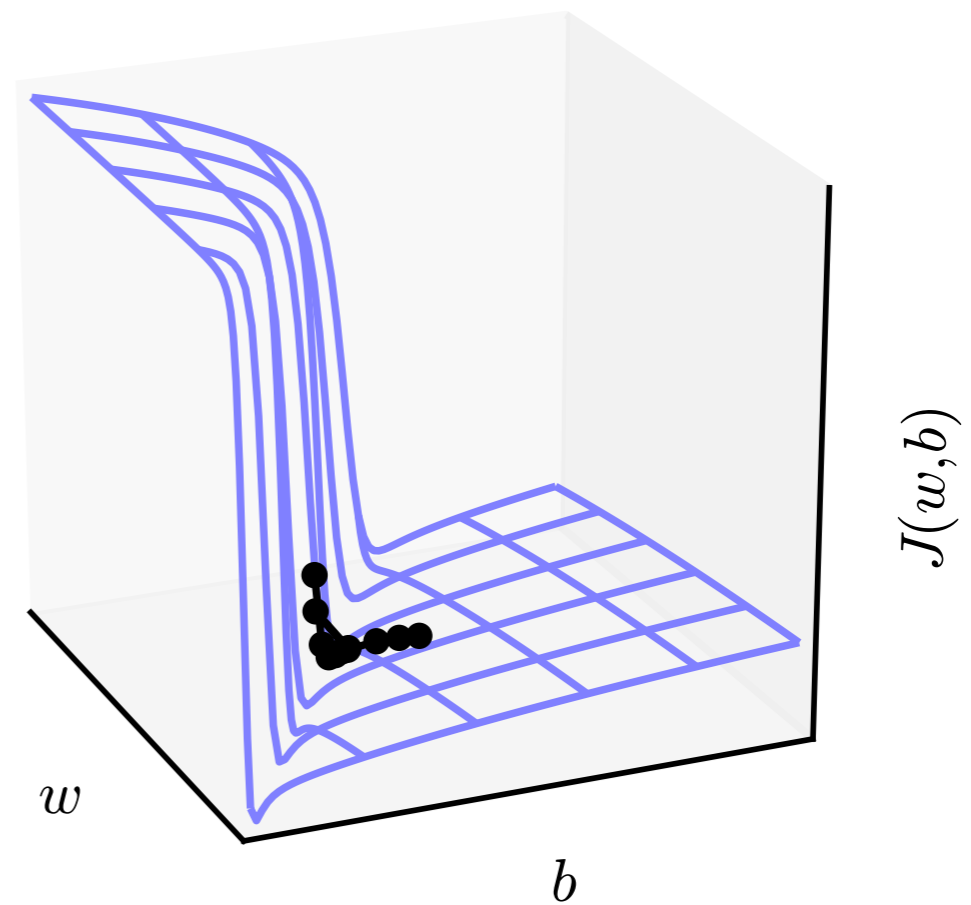Figure 10.16

Gradient Clipping

Without clipping

With clipping

Figure 10.17

Networks with explicit Memory

Figure 10.18