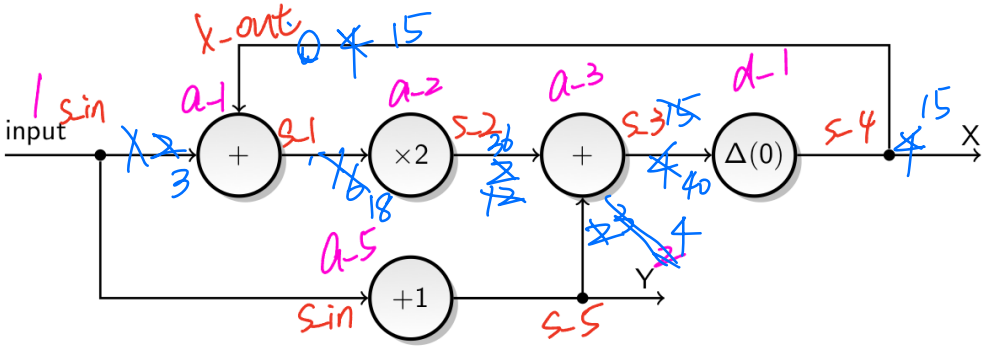
6. (**Mandatory**) Given is the following synchronous process network. All processes are synchronous processes, which execute according to the perfect synchrony hypothesis that also forms the base for the synchronous languages.



All processes execute simple mathematical functions except the process $\Delta(0)$. The process $\Delta(0)$ delays an input event one event cycle and has 0 as value for its first output event.

Given are the values of the following sequence of the first three input events: 1, 2, 3.

(a) Is it possible to determine the output sequence with the given information? Motivate!

Yes. $\Delta(0)$ generate a sequence start with 0 so the output sequence can be produced

(b) If it is possible, give also the output sequence. Show also the order relation between the individual output events on X and Y.

$X = [4\ 15\ 40 \cdots]$

$Y = [2\ 3\ 4\ \cdots]$

$Y_i = input_i + 1$

$X_i = (input_i + X_{i-1}) \times 2 + Y_i$

(c) Explain the terms *tag*, *value*, *event*, *signal*, and *process* as defined in the *tagged signal model*.

signal (a set of events): event, event, event, ⋮

event { tag : physical time / discrete time; value }

process: a function of input signals to output signals

(d) What relation can you establish between the tags of the signals `input`, `X`, and `Y`.

tag_Y = tag_input = tag_X + 1

X is 1 time unit later