Furkan Salık – 150200056

**Part 2)**

It is not memoryless, since the system depends on inputs other than the present.

It is non-invertible since we cannot uniquely identify for .

It is not causal since it depends on future inputs.

It is not stable since a bounded input yields unbounded output, because of part.

It is memoryless, since it depends on only the present input.

It is not invertible since some 2 inputs may lead to the same outputs.

It is causal since it does not depend on future inputs.

It is stable since for , so the outputs are bounded.

It is not memoryless since it depends on past inputs.

It is invertible, since distinct inputs lead to distinct outputs, and its inverse is

It is causal since it does not depend on future inputs.

It is not stable since output is unbounded for a bounded input.

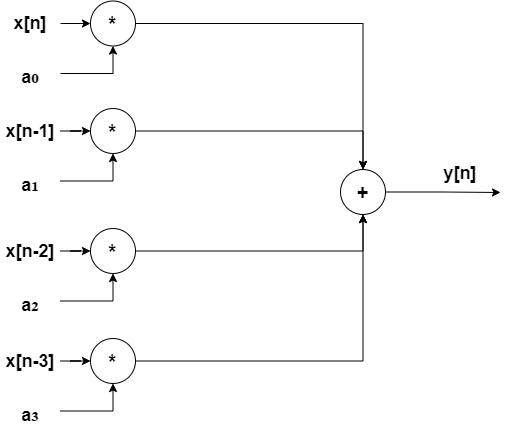
It is not memoryless since it depends on inputs other than the present.

It is not invertible since and pairs are interchangeable, so it is not possible to uniquely form using .

It is not causal since for , it depends on future inputs.

It is stable since for , so the outputs are bounded.

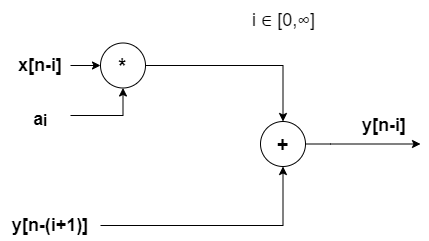
**Part 3)**



**B)** Let largest one among the products be and be bounded by . (). Then, at maximum, , so the outputs would also be bounded. Therefore, the system is BIBO stable for all real numbers .

**C)**

**A)**



In the diagram above, must be initially to maintain the desired order of coefficients (from 0 to ∞).

**B)** The system is not BIBO stable since for a bounded input, the output is unbounded and goes to infinity.