Overflow Limit cycle oscillations

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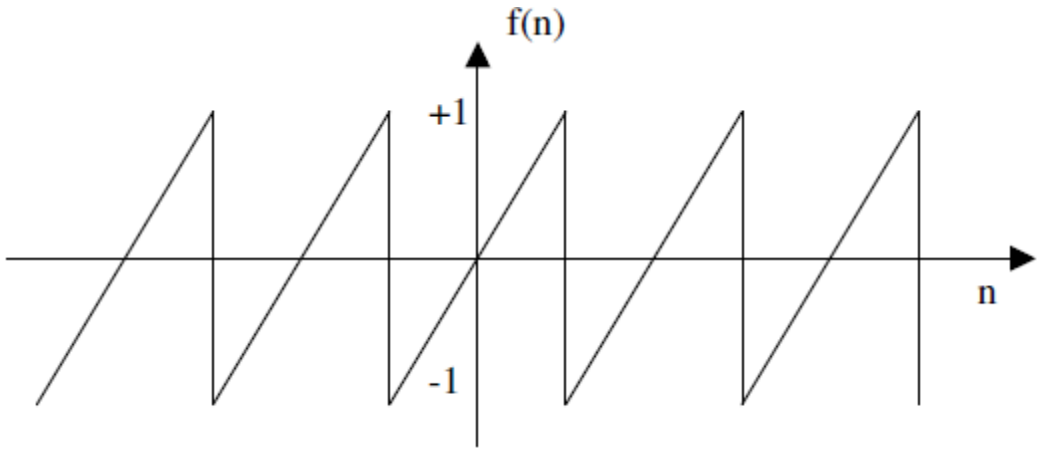
- In addition to limit cycle oscillations causing by rounding the result of multiplications there are several types of limit cycle oscillations caused by addition, which make the filter output oscillate between maximum and minimum amplitudes.

- Such limit cycles have been referred to as overflow oscillations.

- An overflow in addition of two or more binary numbers occurs when the sum exceeds the word size available in the digital implementation of the system.

- The transfer characteristics of an adder is shown in the following diagram. (n is the input to the adder and f(n) is the corresponding output)



- From the figure we can find that overflow occurs if the total input is out of range (-1,1).

- This problem can be eliminated by modifying the adder characteristics (saturating adder transfer characteristics) as shown in the diagram.

- Here, when an overflow is detected, the sum of adder is set equal to the maximum value.