

## System Properties - Stability

A system is said to be stable if and only if inputs to the system yield bounded outputs. This requires that the input signals also be bounded.

A system with the impulse response of :

$$h(t) = e^{-6|t|}$$

Can be considered stable, assuming bounded input signals, because for all values of 't', h(t) will be less than 1. Thus, 1 is considered the upper bounds of the system. If the absolute value symbol around the 't' were to be removed, then the system would become unstable. This is because negative values of 't' would allow h(t) to approach infinity.

A system having the impulse response of :

$$h(t) = e^{-6t} \cdot u(3-t)$$

Is unstable because the step function is equal to 1 for negative values of 't'. This allows the exponential to approach infinity as 't' approaches negative infinity.