3.1 Definition of Stability

The term stability refers to the stable working condition of a control system. Every Working system is designed to be stable. In a stable, the response or output is predictable, finite and stable for a given input.

The different definitions of the stability are the following

1. A system is stable, if its output is bounded for any bounded input.

2. A system is asymptotically stable, if in the absence of the input, the output tends towards zero irrespective of initial conditions.

3. A system is stable if for a bounded disturbing input signal the output vanishes ultimately as t approaches infinity.

4. A system is unstable if for a bounded disturbing input signal the output is of infinite amplitude or oscillatory.

5. For a bounded input signal, if the output has constant amplitude oscillations then The system may be stable or unstable under some limited constraints. Such a system is called limitedly stable.

6. If a system output is stable for all variations of its parameters, then the system is called absolutely stable system.

7. If a system output is stable for a limited range of variations of its parameters, then the system is called conditionally stable system.

ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY
PALKULAM, KANYAKUMARI
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