

EE2227-CONTROL SYSTEMS

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QUESTION

Q. The Nyquist stability criterion and the Routh criterion both are powerful analysis tools for determining the stability of feedback controllers. Identify which of the following statements is FALSE:

- (A) Both the criteria provide information relative to the stable gain range of the system.
- (B) The general shape of the Nyquist plot is readily obtained from the Bode magnitude plot for all minimum-phase systems.
- (C) The Routh criterion is not applicable in the condition of transport lag, which can be readily handled by the Nyquist criterion.
- (D) The closed-loop frequency response for a unity feedback system cannot be obtained from the Nyquist plot.

The answer is option:(D)

The closed-loop frequency response for a unity feedback system cannot be obtained from the Nyquist plot.

Reasons for the options

Option(A) Both the criteria provide information relative to the stable gain range of the system is true.

Option(B) It's true because as in a minimum-phase system, Bode magnitude plot is enough to obtain a general approximation of its Nyquist plot.

Reasons for the options

Option(C) Routh criterion can be applied to any system to check the stability of a system but a transport lag controller can only be explained using Nyquist Criterion.

Option(D) We can obtain closed-loop frequency response for Unity Feedback system easily by substituting $s = j$, and draw the plot for different values of ω . Usually this is not done as it is not necessary as OLTF is enough to comment on the stability. Thus, (D) is false.

Thank you