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Chapter 1, Problem 2P

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Problem

Explain the difference between open-and closed-loop control.

Step-by-step solution

Step 1 of 3

An open loop control system is the one in which the output does not affect the input, whereas in a closed loop control system the output of the system is influenced by the input of the system. There are many differences between the open loop and the closed loop control systems. Refer to Figure 1.9 in the text book to understand the difference between an open loop and a closed loop control system.

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Step 2 of 3

Tabulate the difference between the open loop and the closed loop control systems.

Open loop control system	Closed loop control system
In this system there is no feedback path between the output and the input.	In this system there exists a feedback path between the output and the input.
As there is no feedback, the output doesn't affect the input	As there exist feedback, the output effects the input of the system
As there is no feedback, there exists an error in between the input and the output. The error cannot be measured and rectified.	Because of presence of feedback, the error at the input of the system can be measured and can be rectified.
The open loop control system is small and simple.	The closed loop control system is complex and costly.

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Step 3 of 3

Write few more differences between open loop and closed loop control system.

Open loop control system	Closed loop control system
As the error at the input cannot be calculated and corrected, the system is inaccurate.	As the error presented at the input can be measured and reduced, the system is very accurate.
As the circuit is very simple, it needs less maintenance.	As the circuit is complex, it needs high maintenance.
As the output does not affect the input, the output is always stable.	For every small change at the input due to feed back the output deviates from its stable condition, and hence the system is not as stable as open loop system.
It is less sensitive to noise and interference.	It is highly sensitive to noise and interference.

Thus, the differences between the open and closed loop control system are explained.

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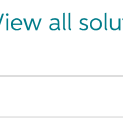
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