Lab: Understanding Open vs. Closed-Loop Systems without Controllers

**Objective:**
To illustrate the distinction between open-loop and closed-loop systems without incorporating controllers using MATLAB and Simulink.

**Equipment:**
- MATLAB software with Simulink
- Computer with adequate processing capabilities

**Setup:**

**Part 1: Open-Loop System**
1. **Modeling:**
   - Create a Simulink model representing a simple system (e.g., an integrator, transfer function).
   - Introduce an input signal (e.g., step, ramp) directly connected to the system.

2. **Simulation:**
   - Run the simulation and observe the system's response without any feedback or corrective mechanisms.
   - Analyze the behavior of the system concerning input changes.

3. **Observation:**
   - Record and analyze the system's response in the absence of feedback.
   - Note any delays, errors, or inability to adapt to changes.

**Part 2: Closed-Loop System (Open-loop with Feedback)**
1. **Modeling:**
   - Replicate the initial Simulink model representing the same system.
   - Introduce a feedback loop by connecting the system's output to a scope or display block.

2. **Simulation:**
   - Run the simulation with the closed-loop system configuration (though without introducing any controller or corrective mechanisms).
   - Observe how the system behaves with feedback.

3. **Observation:**
   - Analyze the system's response in the "closed-loop" system without controllers.
   - Compare the responses between the open and closed-loop setups, despite not utilizing controllers.

**Analysis:**
- Compare the responses between the open and closed-loop systems without controllers.
- Note any improvements or differences observed in the closed-loop setup, even without explicit corrective mechanisms.

**Conclusion:**
- Summarize and present the observed differences between open and "feedback-introduced" closed-loop systems without controllers.
- Discuss the inherent advantages of systems with feedback, even when not explicitly using controllers, emphasizing stability or adaptability to changes.

This lab will showcase the inherent disparity between open-loop and "feedback-introduced" closed-loop systems, even without incorporating controllers, emphasizing the role of feedback in system performance.