



Water Level Control in Reservoirs using Open Loop Control Systems

Federik Mark*

Department of Engineering, University of Georgia, Athens, Georgia, United States of America

*Corresponding Author: Federik Mark, Department of Engineering, University of Georgia, Athens, Georgia, United States of America; E-mail: markfed@uog.edu

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Description

Water level control in reservoirs is an important task to ensure the steady supply of water for various purposes like irrigation, drinking water, and power generation. The level of water in a reservoir depends on various factors like rainfall, inflow, and outflow. To maintain the desired water level, various control systems are employed, and one such system is an open-loop control system.

An open-loop control system is a type of control system where the output of the system is not fed back to the input to make corrections. In the case of water level control in reservoirs, an open-loop control system is employed to maintain a steady level of water by controlling the inflow and outflow of water based on the expected water demand.

The open-loop control system for water level control in reservoirs comprises of various components like sensors, actuators, and controllers. The sensors measure the water level in the reservoir, and based on the measured values, the controller determines the desired water level. The actuators control the inflow and outflow of water to maintain the desired water level.

The open-loop control system for water level control in reservoirs can be explained in detail using the following steps

- **Step 1-Measurement of water level:** The first step in the open-loop control system for water level control in reservoirs is to measure the water level in the reservoir. Various sensors like ultrasonic sensors, radar sensors, and pressure sensors are used to measure the water level accurately.

- **Step 2-Determination of desired water level:** Based on the measured water level, the controller determines the desired water level. The desired water level is the level that needs to be maintained in the reservoir to ensure a steady supply of water.
- **Step 3-Control of inflow:** To maintain the desired water level, the inflow of water needs to be controlled. The inflow of water depends on various factors like rainfall, upstream inflow, and evaporation. Based on the expected water demand, the controller determines the required inflow of water to maintain the desired water level.
- **Step 4-Control of outflow:** The outflow of water from the reservoir also needs to be controlled to maintain the desired water level. The outflow of water depends on various factors like downstream water demand, power generation, and flood control. Based on the expected water demand, the controller determines the required outflow of water to maintain the desired water level.
- **Step 5-Implementation of control:** The final step in the open-loop control system for water level control in reservoirs is the implementation of control. The controller sends signals to the actuators to control the inflow and outflow of water to maintain the desired water level.

Conclusion

Open loop control systems can be used to control the water level in reservoirs, but they have some limitations. Open loop control systems rely on a predetermined set of inputs to achieve a desired output, without taking into account any changes or disturbances that may occur. Therefore, open loop control systems may not be effective in situations where the water level in the reservoir is affected by external factors such as rainfall, evaporation, or changes in the water flow.

In addition, open loop control systems require accurate and consistent measurement of the water level in the reservoir, as any errors in measurement can result in inaccurate control of the water level. This means that regular maintenance and calibration of the measurement equipment are critical to the effective operation of open loop control systems.

Overall, while open loop control systems can be used for water level control in reservoirs, they may not be the most effective solution in all situations. Other control systems, such as closed-loop feedback control systems that incorporate sensors and real-time adjustments based on feedback, may be more effective in ensuring accurate and stable control of the water level in the reservoir.