

ABSTRACT

This study aims to develop a balance control system for the Badaya-Sas humanoid dance robot using an IMU (Inertia Measurement Unit) sensor and PID (Proportional-Integral-Deverative) controller. A humanoid dance robot is a humanoid robot capable of performing human-like dances. However, in order to perform human-like dances stably, a control system is needed that can maintain the balance of the robot. The method used in this research is to use the IMU sensor as a sensor to get the position of the robot.

Furthermore, this balance control system uses a PID control system. Maintaining the CoM (Center of Mass) on the robot by changing the pitch angle is the method used to maintain the balance of the robot. The trials were carried out on an inclined plane using this system.

The results showed that the balance control system can maintain the balance of the Badaya-Sas humanoid dance robot on an inclined plane up to 20° pitch angle. In addition, this system is also expected to increase the stability of dance movements. The conclusion of this study is that a balance control system using an IMU sensor and a PID controller can be used to maintain the balance of the Badaya-Sas humanoid robot.

Keywords: *Humanoid Robot, Balance, PID, IMU*