

## ABSTRACT

Humans are living beings who are constantly moving to carry out their daily activities. The human ability to carry out activities is also influenced by one of them by the balance of the body. Body balance is generally defined as a person's ability to maintain or restore a state of balance during an upright posture without having to change the base of support. Body balance is also often assessed as the amount of postural sway (also called body sway) of the human body. Body sway is defined as a mild postural movement performed by an individual to maintain a balanced position. Previous studies have explained that when the human body sways, humans move like a pendulum around the ankle joint. Other research has also investigated the ankle joints, hips, and other parts of the body that affect body balance.

In this final project a system is designed to test the balance of the human body by measuring the value of body sway, including using the IMU (Inertial Measurement Unit) sensor and a force platform. Body sway measurements will be carried out in an upright position with several scenarios. IMU sensors are used on the shin and groin to represent the legs and hips.

This final project produces a body balance testing system using a force platform and IMU sensors. The load cell sensor has an error range of (2.02 - 7.42) % and the error range of the IMU sensor is (0.04 - 3.2) %. A small range error value indicates that the measurement results are not far from the reference mass and reference angle. In this final project, the measurement results obtained from the IMU sensor give the direction of the wobble of the legs and hips in the form of an angle. These results strengthen the measurement of the force platform, that the legs and pelvis also affect body balance.

**Kata Kunci:** *body sway, base of support, force platform.*