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FINAL REPORT:
KNEE EXOSKELETON ROBOT LEG

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ABSTRACT

An inertial measurement unit works by detecting the current rate of acceleration using one or more accelerometers, and detects changes in rotational attributes like pitch, roll and yaw using one or more gyroscopes. And some also include a magnetometer, mostly to assist calibration against orientation drift. Inertial navigation systems contain IMUs which have angular and linear accelerometers (for changes in position); some IMUs include a gyroscopic element for maintaining an absolute angular reference. Angular accelerometers measure how the vehicle is rotating in space. Generally, there is at least one sensor for each of the three axes: pitch (nose up and down), yaw (nose left and right) and roll (clockwise or counter-clockwise from the cockpit).

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Knee Exoskeleton Robot

An internal measurement unit (IMU) is an electronic device that measures and reports a body's specific force, angular rate, and magnetic field surrounding the body using combination of accelerometers and gyroscopes. IMU are typically used to maneuver aircraft, including unmanned aerial vehicles (UAVs) and spacecraft. Recent development allows for the production of IMU-enabled GPS devices.

Knee Exoskeleton robot consist of leg part that will be supported with mechanical robotic leg designed for the robot. It has the function for standing, walking, jumping, running and kicking. This contribution is concerned with joint angle calculation based on inertial measurement data in the context of human motion analysis.

In this project, the robotic leg will be controlled by mimicking the human leg part by wireless transmission that allows the data being collected from the IMU's sensor that will make the computer track the angle, axes and position of the leg movement. Thus, resulting in actual action of movement of the knee exoskeleton robot leg.