

**RANCANG BANGUN ROBOT PENYEDOT DEBU
INERTIAL MEASUREMENT UNIT (IMU) BERBASIS
PROPORTIONAL INTEGRAL DERIVATIVE (PID) ZIEGLER-
NICHOLS WALL FOLLOWER DENGAN LAMPU
ULTRAVIOLET C**

RAYNALDYN RAFAEL LUMBAN TOBING

ABSTRAK

Kebersihan merupakan suatu aspek penting dalam kehidupan manusia sehari-hari karena berhubungan langsung dengan kesehatan dan kenyamanan manusia. Terlebih lagi kebersihan lantai harus tetap diperhatikan, sebab lantai adalah area yang sering diinjak orang, terpapar debu, kotoran, serta terdapat mikroorganisme penyebab penyakit (patogen). Robot bisa sangat membantu aktifitas sehari-hari manusia dan dapat menghemat waktu. Melalui penelitian ini dibuat inovasi robot penyedot debu yang mampu bergerak secara otomatis dengan mikrokontroler serta dilengkapi dengan lampu Ultraviolet C berbasis kendali PID Ziegler-Nichols *Wall Follower*. Berdasarkan metode *trial error* diperoleh hasil pengujian yang menunjukkan bahwa robot penyedot debu mampu bergerak secara otomatis, bisa mendeteksi halangan pada jalur sehingga tidak menabrak, kecepatan dinamis dan nilai $K_p = 8,77$; $K_i = 0,0000000187$; $K_d = 3,877$.

Kata Kunci: Kebersihan, Mikrokontroler, Penyedot Debu, PID, Ultraviolet C

***DESIGN OF AN INERTIAL MEASUREMENT UNIT (IMU)
VACUUM CLEANER ROBOT BASED ON PROPORTIONAL
INTEGRAL DERIVATIVE (PID) ZIEGLER-NICHOLS WALL
FOLLOWER WITH ULTRAVIOLET C LAMP***

RAYNALDYN RAFAEL LUMBAN TOBING

ABSTRACT

Cleanliness is an important aspect in daily human life because it is directly related to human health and comfort. Moreover, the cleanliness of the floor must be considered, because the floor is an area that is often stepped on by people, exposed to dust, dirt, and the presence of disease-causing microorganisms (pathogens). Robots can be very helpful for human daily activities and can save time. Through this research, an innovative robot vacuum cleaner is made that is able to move automatically with a microcontroller and is equipped with an Ultraviolet C lamp based on Ziegler-Nichols Wall Follower PID control. Based on the trial error method, test results were obtained which showed that the vacuum cleaner robot was able to move automatically, could detect obstacles in the path so it did not crash, dynamic speed and K_p value = 8.77; K_i = 0.0000000187; K_d = 3.877.

Keywords: Cleanliness, Microcontroller, Vacuum Cleaner, PID, Ultraviolet C