ANALISIS HARMONISA ARUS DAN TEGANGAN PADA GEDUNG JICA FPMIPA DI UNIVERSITAS PENDIDIKAN INDONESIA

SKRIPSI

Diajukan Untuk Memenuhi Syarat Memperoleh Gelar Sarjana Teknik

Program Studi S1 Teknik Elektro

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PROGRAM STUDI TEKNIK ELEKTRO

FAKULTAS PENDIDIKAN TEKNIK DAN INDUSTRI

UNIVERSITAS PENDIDIKAN INDONESIA

2025

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Sebuah skripsi yang diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Teknik Elektro pada Program Studi S1 Teknik Elektro

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Agustus 2025

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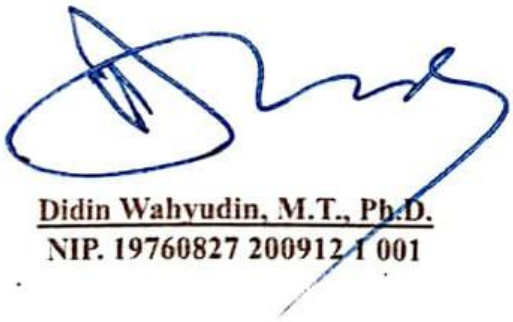

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ABSTRAK

Kualitas daya listrik yang rendah menjadi salah satu tantangan utama pada sistem distribusi tenaga listrik, khususnya akibat tingginya distorsi harmonisa yang dihasilkan oleh pemakaian beban non-linier. Beban nonlinier adalah beban yang hubungan antara arus dan tegangannya tidak linier. Keberadaan beban nonlinier akan menimbulkan gangguan harmonisa. Tingkat harmonisa yang melewati standar dapat menyebabkan gangguan dan kerusakan pada peralatan. Gedung JICA Fakultas Pendidikan Matematikan dan Ilmu Pengetahuan Alam dalam keperluan sehari hari menggunakan banyak peralatan listrik yang merupakan beban listrik nonliner seperti AC, komputer, televisi, dan sebagainya. Tujuan penelitian ini adalah untuk mengetahui dan menganalisis nilai harmonisa arus dan tegangan yang terdapat di dalam sistem tenaga listrik di Gedung JICA FPMIPA UPI. Data harmonisa diperoleh melalui pengukuran langsung di lapangan menggunakan alat ukur HIOKI 3286-20 dan HIOKI 3197, kemudian dianalisis dan disimulasikan dengan perangkat lunak ETAP. Hasil analisis menunjukkan bahwa nilai THD arus dan tegangan dari MDP senilai 5,65% dan 1,46%. Nilai THD arus SDP tiap lantainya memiliki nilai kisaran 5,09%-7% dan nilai THD arus SDP tiap lantainya memiliki nilai kisaran 1,55%-1,56%. Dengan ini menunjukkan bahwa nilai THD arus dan tegangan pada Gedung Timur JICA FPMIPA UPI dikatakan baik dan berada dibawah batas standar yang diperbolehkan IEEE 519-2014.

Kata Kunci: Harmonisa, THD, Kualitas Daya Listrik, Beban Non Linier, ETAP

ABSTRACT

Bad power quality has become one of the main challenges in electrical power distribution systems, particularly due to high harmonic distortion caused by the use of non-linear loads. A non-linear load is one in which the relationship between current and voltage is not linear. The presence of such loads generates harmonic disturbances. Harmonic levels that exceed the standard limits may cause interference and damage to electrical equipment. The JICA Building of the Faculty of Mathematics and Natural Sciences Education (FPMIPA), in its daily operations, utilizes many electrical devices that constitute non-linear loads, such as air conditioners, computers, televisions, and others. The objective of this study is to identify and analyze the harmonic current and voltage levels in the electrical power system of the JICA FPMIPA UPI Building. Harmonic data were obtained through direct field measurements using HIOKI 3286-20 and HIOKI 3197 measuring instruments, and subsequently analyzed and simulated using ETAP software. The analysis results show that the total harmonic distortion (THD) values for current and voltage at the Main Distribution Panel (MDP) are 5.65% and 1.46%, respectively. The current THD values for each floor's Sub Distribution Panel (SDP) range from 5.09% to 7%, while the voltage THD values range from 1.55% to 1.56%. These results indicate that the harmonic current and voltage values at the East Wing of the JICA FPMIPA UPI Building are within the acceptable limits set by the IEEE 519-2014 standard.

Keywords: *Harmonic, THD, Power Quality, Non-Linier Loads, ETAP*

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DAFTAR TABEL

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