

DAFTAR ISI

| | |
|---|-------|
| KATA PENGANTAR | v |
| DAFTAR ISI..... | vii |
| DAFTAR GAMBAR | x |
| DAFTAR TABEL | xiii |
| DAFTAR SIMBOL..... | xiv |
| INTISARI..... | xvii |
| ABSTARCT | xviii |
| BAB 1 PENDAHULUAN | 1 |
| 1.1 Latar Belakang..... | 1 |
| 1.2 Rumusan Masalah | 4 |
| 1.3 Batasan Masalah..... | 4 |
| 1.4 Tujuan Penelitian..... | 5 |
| 1.5 Manfaat Penelitian..... | 5 |
| 1.6 Metodologi Penelitian | 5 |
| 1.7 Sistematika Penelitian | 6 |
| BAB 2 TINJAUAN PUSTAKA | 8 |
| BAB 3 LANDASAN TEORI..... | 11 |
| 3.1 Mobil | 11 |
| 3.1.1 Mobil penggerak belakang..... | 12 |
| 3.2 Logika <i>Fuzzy</i> | 13 |
| 3.2.1 Fungsi keanggotaan logika <i>fuzzy</i> | 13 |
| 3.2.2 Logika operasi <i>fuzzy</i> | 13 |
| 3.2.3 Kaidah <i>if-then</i> | 15 |
| 3.2.4 <i>Fuzzy Mamdani</i> | 15 |
| 3.3 Model Kendali Prediktif (MPC)..... | 17 |
| 3.3.1 Model <i>state space</i> | 19 |
| 3.3.2 Optimasi | 20 |
| 3.4 Motor BLDC | 21 |
| 3.5 Model Motor DC | 23 |

| | | |
|-------|--|----|
| BAB 4 | ANALISIS DAN PERANCANGAN SISTEM | 26 |
| 4.1 | Tahapan Penelitian | 26 |
| 4.2 | Rancangan Model..... | 28 |
| 4.2.1 | Model mobil..... | 29 |
| 4.2.2 | Model motor..... | 29 |
| 4.3 | Alat dan Bahan | 30 |
| 4.3.1 | Alat..... | 30 |
| 4.3.2 | Bahan | 31 |
| 4.4 | Rancangan Perangkat Keras | 33 |
| 4.4.2 | Rancangan elektronik..... | 33 |
| 4.4.3 | Rancangan mekanik | 35 |
| 4.5 | Rancangan Sistem Kendali..... | 36 |
| 4.5.2 | Rancangan <i>fuzzy</i> | 38 |
| 4.5.2 | Rancangan <i>Setpoint Calculator</i> | 43 |
| 4.6 | Simulasi Sistem Kendali | 46 |
| 4.7 | Rancangan algoritme sistem kendali | 47 |
| 4.8 | Rancangan Pengujian Sistem | 48 |
| 4.8.1 | Rancangan pengujian <i>mode manual</i> | 48 |
| 4.8.2 | Rancangan pengujian <i>mode cruise</i> | 49 |
| 4.8.3 | Rancangan pengujian <i>mode follow</i> | 49 |
| BAB 5 | IMPLEMENTASI..... | 51 |
| 5.1 | Implementasi Perangkat Keras | 51 |
| 5.1.1 | Implementasi elektronik..... | 51 |
| 5.1.2 | Implementasi mekanik | 52 |
| 5.2 | Penentuan Parameter Kendali..... | 53 |
| 5.3 | Simulasi Sistem Kendali | 55 |
| 5.4 | Pengujian Sistem | 57 |
| 5.4.1 | Pengujian <i>mode manual</i> | 58 |
| 5.4.2 | Pengujian <i>mode cruise control</i> | 59 |
| 5.4.3 | Pengujian <i>mode follow</i> | 59 |
| BAB 6 | HASIL DAN PEMABAHSAAN | 60 |

| | | |
|-------|--|----|
| 6.1 | Hasil Pengujian Sensor..... | 60 |
| 6.1.1 | Pengujian sensor arus..... | 60 |
| 6.1.2 | Pengujian sensor tegangan | 61 |
| 6.1.3 | Pengujian sensor lidar | 63 |
| 6.2 | Hasil Pengujian dan Validasi Sistem..... | 65 |
| 6.2.1 | Hasil pengujian <i>modemanual</i> | 67 |
| 6.2.2 | Hasil pengujian mode <i>cruise control</i> | 74 |
| 6.2.3 | Hasil pengujian <i>mode follow</i> | 78 |
| BAB 7 | KESIMPULAN..... | 85 |
| 7.1 | Kesimpulan..... | 85 |
| 7.2 | Saran..... | 85 |
| | Daftar Pustaka | 86 |
| | Lampiran | 88 |