

DAFTAR ISI

| | |
|---|-------------------------------------|
| ABSTRAK | Error! Bookmark not defined. |
| ABSTRACT | ii |
| DAFTAR ISI | iii |
| DAFTAR TABEL | v |
| DAFTAR GAMBAR | vi |
| BAB I PENDAHULUAN | Error! Bookmark not defined. |
| 1.1. Latar Belakang | Error! Bookmark not defined. |
| 1.1. Rumusan Masalah | Error! Bookmark not defined. |
| 1.2. Tujuan Penelitian..... | Error! Bookmark not defined. |
| 1.3. Manfaat Penelitian..... | Error! Bookmark not defined. |
| BAB II KAJIAN PUSTAKA | Error! Bookmark not defined. |
| 2.1. <i>Time Series Analysis</i> | Error! Bookmark not defined. |
| 2.2. <i>Exponential Smoothing</i> | Error! Bookmark not defined. |
| 2.2.1. <i>Single exponential smoothing</i> | Error! Bookmark not defined. |
| 2.2.2. <i>Double exponential smoothing</i> | Error! Bookmark not defined. |
| 2.2.3. <i>Triple exponential smoothing</i> | Error! Bookmark not defined. |
| 2.3. <i>Bootstrap di Time Series Analysis</i> | Error! Bookmark not defined. |
| 2.4. <i>Parallel Computing</i> | Error! Bookmark not defined. |
| 2.4.1. <i>Message Passing Interface (MPI)</i> | Error! Bookmark not defined. |
| 2.4.2. <i>Parallel Virtual Machine (PVM)</i> | Error! Bookmark not defined. |
| 2.5. Bahasa Pemrograman R | Error! Bookmark not defined. |
| 2.6. <i>Time Series Analysis</i> di R..... | Error! Bookmark not defined. |
| 2.7. <i>Parallel Computing</i> di R | Error! Bookmark not defined. |
| 2.8. <i>Data Time Series</i> Elemen Orbit | Error! Bookmark not defined. |
| BAB III METODOLOGI PENELITIAN | Error! Bookmark not defined. |
| 3.1. Alat dan Bahan Penelitian | Error! Bookmark not defined. |
| 3.1.1. Alat Penelitian..... | Error! Bookmark not defined. |

| | | |
|---|---|-------------------------------------|
| 3.1.2. | Bahan Penelitian | Error! Bookmark not defined. |
| 3.2. | Desain Penelitian | Error! Bookmark not defined. |
| 3.3. | Metode Penelitian..... | Error! Bookmark not defined. |
| 3.3.1. | Pengumpulan Data | Error! Bookmark not defined. |
| 3.3.2. | Pengembangan Perangkat Lunak | Error! Bookmark not defined. |
| BAB IV HASIL PENELITIAN DAN PEMBAHASAN | | Error! Bookmark not defined. |
| 4.1. | Pengumpulan Data Sampel | Error! Bookmark not defined. |
| 4.2. | Pengembangan Model <i>Exponential Smoothing</i> dengan <i>Parallel Computing</i> | Error! Bookmark not defined. |
| 4.2.1. | Import Data | Error! Bookmark not defined. |
| 4.2.2. | <i>Bootstrap</i> | Error! Bookmark not defined. |
| 4.2.3. | Modifikasi <i>Exponential Smoothing</i> dengan <i>Parallel Computing</i> | Error! Bookmark not defined. |
| 4.2.4. | Perhitungan Hasil Akhir Peramalan Elemen Orbit | Error! Bookmark not defined. |
| 4.3. | Desain Eksperimen..... | Error! Bookmark not defined. |
| 4.4. | Hasil Eksperimen | Error! Bookmark not defined. |
| 4.4.1. | Perhitungan <i>Margin</i> Hasil Peramalan Elemen Orbit dengan Algoritma BS | Error! Bookmark not defined. |
| 4.4.2. | Hasil Peramalan Elemen Orbit Dengan <i>Exponential Smoothing</i> Konvensional | Error! Bookmark not defined. |
| 4.4.3. | Hasil Peramalan Elemen Orbit dengan penggabungan metode <i>Exponential Smoothing</i> dengan <i>Parallel Computing</i> | Error! Bookmark not defined. |
| 4.5. | Analisis Hasil Ekperimen | Error! Bookmark not defined. |
| BAB V KESIMPULAN DAN SARAN | | Error! Bookmark not defined. |
| 5.1. | Kesimpulan..... | Error! Bookmark not defined. |
| 5.2. | Saran | Error! Bookmark not defined. |
| DAFTAR PUSTAKA | | Error! Bookmark not defined. |
| LAMPIRAN | | Error! Bookmark not defined. |

DAFTAR TABEL

Tabel 4.1 *Margin* antara hasil *exponential smoothing* dengan algoritma BS **Error! Bookmark not defined.**

Tabel 4.2 Ringkasan hasil peramalaan elemen orbit dengan *parallel computing* dan *exponential smoothing*.....**Error! Bookmark not defined.**

Tabel 4.3 *Margin* hasil peramalan elemen orbit menggunakan PES dengan algoritma BS pada percobaan ke-1**Error! Bookmark not defined.**

Tabel 4.4 *Margin* hasil peramalan elemen orbit menggunakan PES dan algoritma BS pada percobaan ke-2.....**Error! Bookmark not defined.**

DAFTAR GAMBAR

Gambar 1.1. Lintasan bumi mengelilingi matahari (Astronomi, 2016)..... **Error! Bookmark not defined.**

Gambar 1.2. Contoh pergerakan parameter ω pada elemen Kepler..... **Error! Bookmark not defined.**

Gambar 2.1. Grafik data time series produksi susu sapi (Cryer, 2016) **Error! Bookmark not defined.**

Gambar 2.2. Contoh simulasi *parallel computing* (Barney & Lawrence, 2016) **Error! Bookmark not defined.**

Gambar 2.3 Halaman utama pada *website* CRAN (CRAN, 2016) **Error! Bookmark not defined.**

Gambar 2.4 Tampilan *task view* di CRAN (CRAN, 2016)**Error! Bookmark not defined.**

Gambar 2.5 Hasil survei *predictive analytic* (Piatetsky & KDnuggets, 2016) **Error! Bookmark not defined.**

Gambar 2.6. Tampilan *task view time series analysis* di CRAN (CRAN, 2016) **Error! Bookmark not defined.**

Gambar 2.7 Tampilan *package* “foreach” di CRAN (CRAN, 2016) **Error! Bookmark not defined.**

Gambar 2.8 Contoh kode program *exponential smoothing* di R (Hyndman & Athanasopoulos, 2016)..... **Error! Bookmark not defined.**

Gambar 2.9. Tampilan *task view parallel computing* di CRAN (CRAN, 2016)
**Error! Bookmark not defined.**

Gambar 2.10. Contoh penggunaan *foreach loop* (Weston, 2016)..... **Error!
 Bookmark not defined.**

Gambar 2.11: Contoh penggunaan *foreach combine* (Weston, 2016)..... **Error!
 Bookmark not defined.**

Gambar 2.12. Pergerakan parameter “a” pada elemen Kepler**Error! Bookmark
 not defined.**

Gambar 2.13. Pergerakan parameter “e” pada elemen Kepler**Error! Bookmark
 not defined.**

Gambar 2.14. Pergerakan parameter “i” pada elemen Kepler**Error! Bookmark
 not defined.**

Gambar 2.15. Pergerakan parameter “ ω ” pada elemen Kepler**Error! Bookmark
 not defined.**

Gambar 2.16. Pergerakan parameter “ Ω ” pada elemen Kepler**Error! Bookmark
 not defined.**

Gambar 3.1. Desain Penelitian.....**Error! Bookmark not defined.**

Gambar 3.2 : Model sekuensial linear (Pressman, 2010)**Error! Bookmark not
 defined.**

Gambar 4.1 Tahapan pengembangan *exponential smoothing* dengan *parallel
 computing*.....**Error! Bookmark not defined.**

Gambar 4.2 : Kode program input data.....**Error! Bookmark not defined.**

Gambar 4.3 : Kode Program Fungsi Bootstrap.....**Error! Bookmark not defined.**

Gambar 4.4 : Kode program import packages**Error! Bookmark not defined.**

Gambar 4.5 : Kode Program menentukan jumlah processor **Error! Bookmark not defined.**

Gambar 4.6 : Kode program exponential smoothing dengan parallel computing **Error! Bookmark not defined.**

Gambar 4.7: Kode program perhitungan rata-rata hasil peramalan elemen orbit dengan *exponential smoothing* dan *parallel computing* **Error! Bookmark not defined.**

Gambar 4.8. Tampilan kinerja CPU di *task manager* **Error! Bookmark not defined.**

Gambar 4.9. Tampilan kinerja CPU di *task manager* **Error! Bookmark not defined.**

Gambar 4.10. Tampilan kinerja CPU di *task manager* **Error! Bookmark not defined.**

Gambar 4.11 Grafik nn terhadap waktu pemrosesan **Error! Bookmark not defined.**

Gambar 4.12 Grafik nn dengan *margin* **Error! Bookmark not defined.**

Gambar 4.13 Grafik jumlah *processor* terhadap waktu pemrosesan **Error! Bookmark not defined.**

Gambar 4.14. Perbandingan waktu pemrosesan *single* dengan *multi processor* **Error! Bookmark not defined.**

Gambar 4.15. Perbandingan serial dengan parallel **Error! Bookmark not defined.**

Gambar 4.16. Perbandingan margin serial dengan parallel **Error! Bookmark not defined.**