### Lampiran 1

#### Tabel 3. Data penduduk tahun 1995

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<th></th>
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<td>Wanita</td>
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<td>10532484</td>
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<td>10914890</td>
<td>10545984</td>
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<td>10082346</td>
<td>9740520</td>
<td>103,5</td>
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<td>7605618</td>
<td>7751430</td>
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<td>6418454</td>
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<td>5077610</td>
<td>5659717</td>
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<td>3758955</td>
<td>94</td>
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<td>91,5</td>
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<td>572001</td>
<td>700620</td>
<td>81,6</td>
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<tr>
<td>80 – 84</td>
<td>617947</td>
<td>260233</td>
<td>357714</td>
<td>72,7</td>
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<tr>
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<td>84731</td>
<td>131616</td>
<td>64,4</td>
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<tr>
<td>90 – 94</td>
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<td>16377</td>
<td>29225</td>
<td>56</td>
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<td>95 – 99</td>
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<td>1657</td>
<td>3401</td>
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Sumber: U.S. Census Bureau, International Data Base
## Lampiran 2

### Tabel 4. Data penduduk tahun 2000

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<td>7.444.456</td>
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<td>40 - 44</td>
<td>13.097.107</td>
<td>6.275.221</td>
</tr>
<tr>
<td>45 - 49</td>
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<td>55 - 59</td>
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<td>75 - 79</td>
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<td>95 - 99</td>
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Sumber: U.S. Census Bureau, International Data Base
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<th>Umur</th>
<th>Populasi Total</th>
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<th>Wanita</th>
<th>Ratio Jenis Kelamin</th>
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<td>1.1564.830</td>
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Sumber: U.S. Census Bureau, International Data Base
### Lampiran 4

Tabel 6. Infant Mortality Rate (IMR) dan Angka Harapan Hidup, berdasarkan Jenis kelamin

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<thead>
<tr>
<th>Tahun</th>
<th>IMR Laki-laki</th>
<th>IMR Wanita</th>
<th>Angka harapan hidup laki-laki</th>
<th>IMR both sexes</th>
<th>IMR laki-laki</th>
<th>IMR wanita</th>
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<td>196.133</td>
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</tr>
<tr>
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<td>68,3</td>
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<td>189.052</td>
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<td>31,9</td>
<td>68,6</td>
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<td>175.044</td>
<td>71.183</td>
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<td>72,1</td>
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Sumber: U.S. Census Bureau, International Data Base

### Lampiran 5

Tabel 7. CBR dan CDR, Migrasi Bersih, dan Rata-rata Pertumbuhan Indonesia

<table>
<thead>
<tr>
<th>Tahun</th>
<th>Kelahiran per 1,000 populasi</th>
<th>Kematian per 1,000 populasi</th>
<th>Migrasi bersih per 1,000 populasi</th>
<th>Laju pertumbuhan penduduk (percent)</th>
<th>Laju pertumbuhan alami (percent)</th>
<th>Kelahiran</th>
<th>Kematian</th>
<th>Pertumbuhan alami</th>
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<td>6,4</td>
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<td>1,43</td>
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<td>-1,4</td>
<td>1,53</td>
<td>1,39</td>
<td>1,397.119</td>
<td>3,366.285</td>
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Sumber: U.S. Census Bureau, International Data Base
Lampiran 6
Tabel 8. Nilai $\mu(x)$

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Lampiran 7  Proses perhitungan dengan formulasi metode kuasi-stabil (menggunakan Software Mathematica 7)

\begin{align*}
\text{b1}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(5*0.00119)+(5*0.00059)]*\exp[(t-x-0)*x]\ \\
\text{b2}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)]*\exp[(t-x-0)*x]\ \\
\text{b3}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)]*\exp[(t-x-0)*x]\ \\
\text{b4}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)]*\exp[(t-x-0)*x]\ \\
\text{b5}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)]*\exp[(t-x-0)*x]\ \\
\text{b6}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)]*\exp[(t-x-0)*x]\ \\
\text{b7}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)]*\exp[(t-x-0)*x]\ \\
\text{b8}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)]*\exp[(t-x-0)*x]\ \\
\text{b9}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)]*\exp[(t-x-0)*x]\ \\
\text{b10}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)]*\exp[(t-x-0)*x]\ \\
\text{b11}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)]*\exp[(t-x-0)*x]\ \\
\text{b12}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)]*\exp[(t-x-0)*x]\ \\
\text{b13}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)]*\exp[(t-x-0)*x] \\
\text{b14}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.02980)]*\exp[(t-x-0)*x] \\
\text{b15}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.02980)+(5*0.03884)]*\exp[(t-x-0)*x] \\
\text{b16}[x_,t_,k_]&:=4791918*\exp[-0.016*x]*\exp[-(0.00747)+(4*0.00747)+(5*0.00119)+(5*0.00059)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.02980)+(5*0.03884)+(5*0.04839)]*\exp[(t-x-0)*x] \\
\end{align*}
19

\[
(0.0067) + (5 \times 0.00101) + (5 \times 0.00132) + (5 \times 0.00160) + (5 \times 0.00199) + (5 \times 0.00263) + (5 \times 0.00374) + (5 \times 0.00553) + (5 \times 0.00827) + (5 \times 0.01279) + (5 \times 0.02082) + (5 \times 0.03504)) \times \exp[(t-x-0) \times k]
\]

\[
b17[x_, t_, k_] := 4791918 \times \exp[-0.016 \times x] \times \exp[-(0.00747 + (4 \times 0.00747) + (5 \times 0.000119) + (5 \times 0.000059) + (5 \times 0.000067) + (5 \times 0.000101) + (5 \times 0.000132) + (5 \times 0.000160) + (5 \times 0.000199) + (5 \times 0.00263) + (5 \times 0.00374) + (5 \times 0.00553) + (5 \times 0.00827) + (5 \times 0.01279) + (5 \times 0.02082) + (5 \times 0.03504) + (5 \times 0.05982))] \times \exp[(t-x-0) \times k]
\]

\[
b18[x_, t_, k_] := 4791918 \times \exp[-0.016 \times x] \times \exp[-(0.00747 + (4 \times 0.00747) + (5 \times 0.000119) + (5 \times 0.000059) + (5 \times 0.000067) + (5 \times 0.000101) + (5 \times 0.000132) + (5 \times 0.000160) + (5 \times 0.000199) + (5 \times 0.00263) + (5 \times 0.00374) + (5 \times 0.00553) + (5 \times 0.00827) + (5 \times 0.01279) + (5 \times 0.02082) + (5 \times 0.03504) + (5 \times 0.05982) + (5 \times 0.09910)) \times \exp[(t-x-0) \times k]
\]

\[
b19[x_, t_, k_] := 4791918 \times \exp[-0.016 \times x] \times \exp[-(0.00747 + (4 \times 0.00747) + (5 \times 0.000119) + (5 \times 0.000059) + (5 \times 0.000067) + (5 \times 0.000101) + (5 \times 0.000132) + (5 \times 0.000160) + (5 \times 0.000199) + (5 \times 0.00263) + (5 \times 0.00374) + (5 \times 0.00553) + (5 \times 0.00827) + (5 \times 0.01279) + (5 \times 0.02082) + (5 \times 0.03504) + (5 \times 0.05982) + (5 \times 0.09910) + (5 \times 0.16192))] \times \exp[(t-x-0) \times k]
\]

\[
b20[x_, t_, k_] := 4791918 \times \exp[-0.016 \times x] \times \exp[-(0.00747 + (4 \times 0.00747) + (5 \times 0.000119) + (5 \times 0.000059) + (5 \times 0.000067) + (5 \times 0.000101) + (5 \times 0.000132) + (5 \times 0.000160) + (5 \times 0.000199) + (5 \times 0.00263) + (5 \times 0.00374) + (5 \times 0.00553) + (5 \times 0.00827) + (5 \times 0.01279) + (5 \times 0.02082) + (5 \times 0.03504) + (5 \times 0.05982) + (5 \times 0.09910) + (5 \times 0.16192) + (5 \times 0.26560))] \times \exp[(t-x-0) \times k]
\]

\[
b21[x_, t_, k_] := 4791918 \times \exp[-0.016 \times x] \times \exp[-(0.00747 + (4 \times 0.00747) + (5 \times 0.000119) + (5 \times 0.000059) + (5 \times 0.000067) + (5 \times 0.000101) + (5 \times 0.000132) + (5 \times 0.000160) + (5 \times 0.000199) + (5 \times 0.00263) + (5 \times 0.00374) + (5 \times 0.00553) + (5 \times 0.00827) + (5 \times 0.01279) + (5 \times 0.02082) + (5 \times 0.03504) + (5 \times 0.05982) + (5 \times 0.09910) + (5 \times 0.16192) + (5 \times 0.26560) + (5 \times 0.43595))] \times \exp[(t-x-0) \times k]
\]

\[
b22[x_, t_, k_] := 4791918 \times \exp[-0.016 \times x] \times \exp[-(0.00747 + (4 \times 0.00747) + (5 \times 0.000119) + (5 \times 0.000059) + (5 \times 0.000067) + (5 \times 0.000101) + (5 \times 0.000132) + (5 \times 0.000160) + (5 \times 0.000199) + (5 \times 0.00263) + (5 \times 0.00374) + (5 \times 0.00553) + (5 \times 0.00827) + (5 \times 0.01279) + (5 \times 0.02082) + (5 \times 0.03504) + (5 \times 0.05982) + (5 \times 0.09910) + (5 \times 0.16192) + (5 \times 0.26560) + (5 \times 0.43595) + (5 \times 0.43595)) \times \exp[(t-x-0) \times k]
\]
Lampiran 8  Proses mencari nilai \( k \) yang terbaik (menggunakan Software Mathematica 7)

```
Manipulate[Total[p[0,k]], {k,0.000133809,0.001,0.000000000001}]
```

\[
0.0008322 \sqrt{82} 
\]

\[
1.07036292 \times 10^8
\]
Lampiran 9 Pembuatan Plot tahun 2005 per satuan umur dengan menggunakan nilai $k$ yang terbaik (menggunakan Software Mathematica 7)

```plaintext
pp2005 = {0.0008328184};
mm1 = pp2005[[1]];
mm2 = Total[pp2005[[2 ;; 4]], pp2005[[5 ;; 9]], pp2005[[10 ;; 14]]]/5;
mm3 = Total[pp2005[[16 ;; 18]], pp2005[[19 ;; 23]], pp2005[[24 ;; 28]]]/4;
mm4 = Total[pp2005[[31 ;; 33]], pp2005[[34 ;; 38]], pp2005[[39 ;; 43]]]/5;
mm5 = Total[pp2005[[41 ;; 43]], pp2005[[44 ;; 48]], pp2005[[49 ;; 53]]]/5;
mm6 = Total[pp2005[[51 ;; 53]], pp2005[[54 ;; 58]], pp2005[[59 ;; 63]]]/5;
mm7 = Total[pp2005[[61 ;; 63]], pp2005[[64 ;; 68]], pp2005[[69 ;; 73]]]/5;
mm8 = Total[pp2005[[71 ;; 73]], pp2005[[74 ;; 78]], pp2005[[79 ;; 83]]]/5;
mm9 = Total[pp2005[[81 ;; 83]], pp2005[[84 ;; 88]], pp2005[[89 ;; 93]]]/5;
mm10 = Total[pp2005[[91 ;; 93]], pp2005[[94 ;; 98]], pp2005[[99 ;; 103]]]/5;

LL1 = Plot[mm1, {x, 0, 1}, PlotStyle -> {Thick, Red}];
LL2 = Plot[mm2, {x, 1, 4}, PlotStyle -> {Thick, Red}];
LL3 = Plot[mm3, {x, 5, 9}, PlotStyle -> {Thick, Red}];
LL4 = Plot[mm4, {x, 10, 14}, PlotStyle -> {Thick, Red}];
LL5 = Plot[mm5, {x, 15, 19}, PlotStyle -> {Thick, Red}];
LL6 = Plot[mm6, {x, 20, 24}, PlotStyle -> {Thick, Red}];
LL7 = Plot[mm7, {x, 25, 29}, PlotStyle -> {Thick, Red}];
LL8 = Plot[mm8, {x, 30, 34}, PlotStyle -> {Thick, Red}];
LL9 = Plot[mm9, {x, 35, 39}, PlotStyle -> {Thick, Red}];
LL10 = Plot[mm10, {x, 40, 44}, PlotStyle -> {Thick, Red}];
LL11 = Plot[mm11, {x, 45, 49}, PlotStyle -> {Thick, Red}];
LL12 = Plot[mm12, {x, 50, 54}, PlotStyle -> {Thick, Red}];
LL13 = Plot[mm13, {x, 55, 59}, PlotStyle -> {Thick, Red}];
LL14 = Plot[mm14, {x, 60, 64}, PlotStyle -> {Thick, Red}];
```

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LL15 = Plot[mm15, {x, 65, 69}, PlotStyle → {Thick, Red}];
LL16 = Plot[mm16, {x, 70, 74}, PlotStyle → {Thick, Red}];
LL17 = Plot[mm17, {x, 75, 79}, PlotStyle → {Thick, Red}];
LL18 = Plot[mm18, {x, 80, 84}, PlotStyle → {Thick, Red}];
LL19 = Plot[mm19, {x, 85, 89}, PlotStyle → {Thick, Red}];
LL20 = Plot[mm20, {x, 90, 94}, PlotStyle → {Thick, Red}];
LL21 = Plot[mm21, {x, 95, 99}, PlotStyle → {Thick, Red}];
LL22 = Plot[mm22, {x, 99, 100}, PlotStyle → {Thick, Red}];
LL = ListPlot[pp2005, Joined → True];
Show[LL, LL1, LL2, LL3, LL4, LL5, LL6, LL7, LL8, LL9, LL10, LL11, LL12, LL13, LL14, LL15, LL16, LL17, LL18, LL19, LL20, LL21, LL22, AxesOrigin → Automatic]
Lampiran 10  Proses perhitungan jumlah penduduk dengan metode stabil (menggunakan Software Mathematica 7)

\[
s_1[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-0.00747]
\]

\[
s_2[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747))]
\]

\[
s_3[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119))]
\]

\[
s_4[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059))]
\]

\[
s_5[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067))]
\]

\[
s_6[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101))]
\]

\[
s_7[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132))]
\]

\[
s_8[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160))]
\]

\[
s_9[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199))]
\]

\[
s_{10}[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199) + (5 \cdot 0.00263)]
\]

\[
s_{11}[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199) + (5 \cdot 0.00263) + (5 \cdot 0.000374)]
\]

\[
s_{12}[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199) + (5 \cdot 0.00263) + (5 \cdot 0.000374) + (5 \cdot 0.000553)]
\]

\[
s_{13}[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199) + (5 \cdot 0.00263) + (5 \cdot 0.000374) + (5 \cdot 0.000553) + (5 \cdot 0.000827)]
\]

\[
s_{14}[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199) + (5 \cdot 0.00263) + (5 \cdot 0.000374) + (5 \cdot 0.000553) + (5 \cdot 0.000827) + (5 \cdot 0.001279)]
\]

\[
s_{15}[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199) + (5 \cdot 0.00263) + (5 \cdot 0.000374) + (5 \cdot 0.000553) + (5 \cdot 0.000827) + (5 \cdot 0.001279) + (5 \cdot 0.02082)]
\]

\[
s_{16}[x, n, r_] := \exp[nr] \cdot 4791918 \cdot \exp[-rx] \cdot \exp[-(0.00747 + (4 \cdot 0.00747) + (5 \cdot 0.00119) + (5 \cdot 0.00059) + (5 \cdot 0.000067) + (5 \cdot 0.00101) + (5 \cdot 0.00132) + (5 \cdot 0.000160) + (5 \cdot 0.000199) + (5 \cdot 0.00263) + (5 \cdot 0.000374) + (5 \cdot 0.000553) + (5 \cdot 0.000827) + (5 \cdot 0.001279) + (5 \cdot 0.02082) + (5 \cdot 0.03504)]
\]
\[ s_{17}[x_,n_,r_]:=\text{Exp}[n*r]*4791918*\text{Exp}[-r*x]*\text{Exp}[-(0.00747+(4*0.00747)+(5*0.00059)+(5*0.00067)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.03504)+(5*0.05982))] \]

\[ s_{18}[x_,n_,r_]:=\text{Exp}[n*r]*4791918*\text{Exp}[-r*x]*\text{Exp}[-(0.00747+(4*0.00747)+(5*0.00059)+(5*0.00067)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.03504)+(5*0.05982)+(5*0.09910))] \]

\[ s_{19}[x_,n_,r_]:=\text{Exp}[n*r]*4791918*\text{Exp}[-r*x]*\text{Exp}[-(0.00747+(4*0.00747)+(5*0.00059)+(5*0.00067)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.03504)+(5*0.05982)+(5*0.09910)+(5*0.16192))] \]

\[ s_{20}[x_,n_,r_]:=\text{Exp}[n*r]*4791918*\text{Exp}[-r*x]*\text{Exp}[-(0.00747+(4*0.00747)+(5*0.00059)+(5*0.00067)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.03504)+(5*0.05982)+(5*0.09910)+(5*0.16192)+(5*0.26560))]] \]

\[ s_{21}[x_,n_,r_]:=\text{Exp}[n*r]*4791918*\text{Exp}[-r*x]*\text{Exp}[-(0.00747+(4*0.00747)+(5*0.00059)+(5*0.00067)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.03504)+(5*0.05982)+(5*0.09910)+(5*0.16192)+(5*0.26560)+(5*0.43595))] \]

\[ s_{22}[x_,n_,r_]:=\text{Exp}[n*r]*4791918*\text{Exp}[-r*x]*\text{Exp}[-(0.00747+(4*0.00747)+(5*0.00199)+(5*0.00067)+(5*0.00101)+(5*0.00132)+(5*0.00160)+(5*0.00199)+(5*0.00263)+(5*0.00374)+(5*0.00553)+(5*0.00827)+(5*0.01279)+(5*0.02082)+(5*0.03504)+(5*0.05982)+(5*0.09910)+(5*0.16192)+(5*0.26560)+(5*0.43595)+(5*0.43595))] \]

**Lampiran 11** Proses mencari nilai \( r \) pada metode stabil (menggunakan *Software Mathematica 7*)

Manipulate[Total[stabil[0,r]],{r,0.016,0.05,0.00001}]

![Manipulate Interface](attachment:image.png)
Lampiran 12  Pembuatan Plot perbandingan masing - masing metode

```math
tahun\{0,1,2,3,4,5\};
thn\{-5,0,1,2,3,4,5\};
stabil\[n\]:=107036292*Exp[n*0.016]
stab=stabil[tahun];
kuasi=Total[p[tahun,0.000133809]]; 
kuasi1=Total[p[thn,0.00083228184]]; 

gbr1a=ListPlot[real,AxesLabel\{t,p[t]\},Joined\[True];
gbr1=ListPlot[stab,AxesLabel\{t,p[t]\},Joined\[True,PlotStyle\{Dashed,Red\}]

gbr2=ListPlot[kuasi,AxesLabel\{t,p[t]\},Joined\[True,PlotStyle\{Dashed,Red\}]

gbr4=ListPlot[kuasi1,AxesLabel\{t,p[t]\},Joined True,PlotStyle\{Dashed,Red\}]

gbr5=ListPlot[P[tahun,0.016],AxesLabel\{t,p[t]\},PlotRange\{0,8,0,2.2*10^8\}]

Show[gbr5,gbr1,gbr1a]
Show[gbr4,gbr1a]
Show[gbr1a,gbr2]
```
Lampiran 13  Menghitung nilai k dengan menggunakan regresi (Microsoft Excel)

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<th>Upper 95%</th>
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<th>Upper 95,0%</th>
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</thead>
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<td>0,000138199</td>
<td>-4,84117</td>
<td>9,91E-05</td>
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<td>0,971845</td>
<td>0,967991</td>
</tr>
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</table>