PROGRAM STUDI STATISTIKA
SK BAN-PT No. 1765/SK/BAN-PT/AK-PPJ/S/III/2022
FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS PGRI ADI BUANA SURABAYA

FORM F.SK05
BUKTI BIMBINGAN SKRIPSI

Nama Mahasiswa : Anggi Emeliani

NIM : 202400008

Judul Skripsi :Pemodelan Geographicaly Weighted Regression pada Kasus Prevalensi Balita Stunting di Provinsi Aceh Tahun 2022

Dosen Pembimbing : Gangga Anuraga, S.Si., M.Si, Ph.D.

Materi Pembimbingan Proposal	Tanda Tangan Dosen Pembimbing
1. Taraf signifikansi penelitian	
2. Analisis deskriptif dan interpretasi Menambahkan standar deviasi	
3. Struktur analisis di regresi linier berganda (OLS)	
4. Estimasi model OLS dan interpretasi Variabel yang signifikan	
5. Jarak *euclidean* dan bandwith di fungsi pembobot	
6. Pemodelan GWR	
7. Peta variabel berpengaruh signifikan Menambahkan analisis di uji signifikansi parameter model GWR	
8. ACC	

Catatan: *) Coret yang tidak sesuai

Lembar ini digunakan untuk mendaftar Seminar dan Ujian Skripsi (bimbingan skripsi minimal 8 kali)

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FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS PGRI ADI BUANA SURABAYA

Unipa Surabaya

FORM F.SK08
PERBAIKAN/REVISI SEMINAR DAN UJIAN SKRIPSI

Nama Mahasiswa : Anggi Emeliani

NIM : 202400008

Judul Skripsi : Pemodelan *Geographically Wighted Regression* pada Kasus Prevalensi Balita Stunting di Provinsi Aceh Tahun 2022

Dosen Pembimbing : Gangga Anuraga, S.Si., M.Si., Ph.D

Materi Revisi Seminar dan Ujian Skripsi	Tanda Tangan Dosen Penguji
1. Penambahan interpretasi mengenai standar deviasi di analisis deskriptif di bab 4	
2. Pemodelan GWR dan interpretasi di bab 4	
3. Penambahan hasil dari jarak euclidean dan matriks pembobot di bab 4	
4. Saran di bab 5	

Surabaya, 24 juli 2024
Dosen Pembimbing,

Gangga Anuraga, S.Si., M.Si., Ph.D
NIP : 198601182015041001

Lembar ini digunakan untuk bukti perbaikan makalah/jurnal dan hasil ujian skripsi Batas waktu revisi proposal dua minggu terhitung dari waktu ujian proposal

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Materi Revisi Seminar dan Ujian Skripsi	Tanda Tangan Dosen Penguji
1. Batasan masalah di bab 1	
2. Penambahan rumus statistika deskriptif di bab 2	
3. ANOVA matriks di bab 2	
4. Sumber buku dari Uji Breush Pagan di bab 2	
5. Penulisan hipotesis dari uji signifikansi parameter model di bab 4	
6. Penambahan abstrak	
7. Langkah analisis di bab 3	
8. Penulisan dan keterangan rumus VIF di bab 2	

Surabaya, 24 JULI 2024
Dosen Pembimbing,

Gangga Anuraga, S.Si., M.Si., Ph.D
NIP : 198601182015041001

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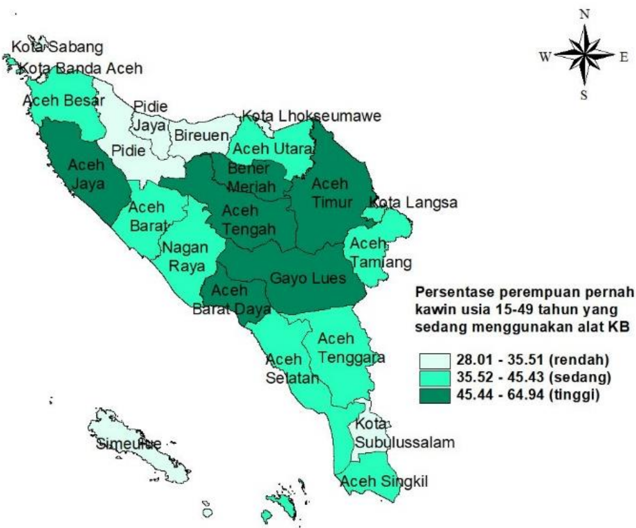
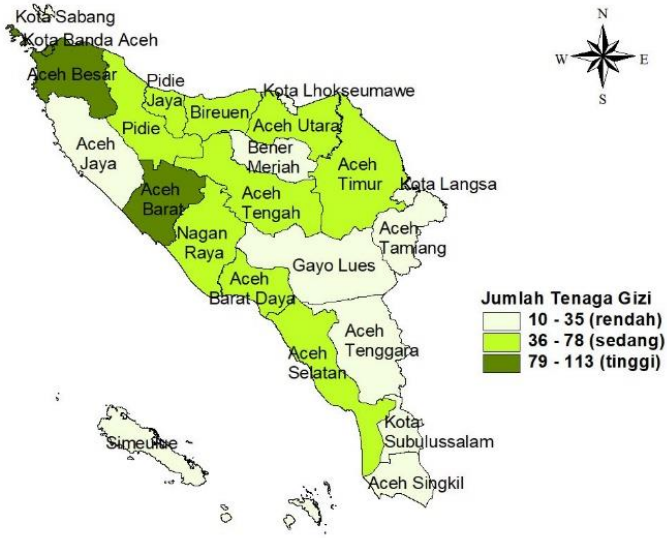
LAMPIRAN

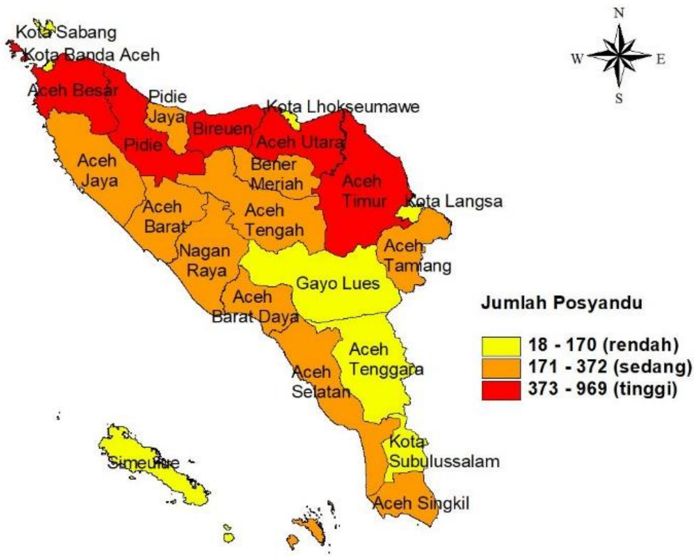
Lampiran 1 Data Penelitian

Lokasi	Kabupaten/Kota	Y	X1	X2	X3	X4	X5	X6	u	v
1	Simeulue	37,20	97,17	41,10	99,02	33,72	28	170	96,02557	2,64397
2	Aceh Singkil	34,00	97,97	44,70	83,50	40,64	29	207	97,87216	2,35895
3	Aceh Selatan	34,80	99,72	59,40	94,66	43,56	54	323	97,35166	3,31151
4	Aceh Tenggara	36,70	79,98	58,00	92,13	39,19	23	104	97,69823	3,30887
5	Aceh Timur	33,60	94,52	76,10	92,78	49,53	69	750	97,61142	4,52241
6	Aceh Tengah	32,00	97,62	60,70	91,20	54,56	69	324	96,83510	4,44826
7	Aceh Barat	20,40	98,81	51,00	95,54	42,71	113	372	96,15270	4,45427
8	Aceh Besar	27,00	97,97	46,40	93,23	38,80	103	638	95,47778	5,45292
9	Pidie	27,80	98,16	52,50	98,33	30,19	78	763	95,93569	5,37041
10	Bireuen	23,40	99,42	71,50	94,38	35,51	71	578	96,71729	5,22210
11	Aceh Utara	38,30	98,38	52,30	96,81	39,94	78	969	97,22214	4,97863
12	Aceh Barat Daya	35,20	94,62	86,70	97,93	49,63	49	219	97,00684	3,79634
13	Gayo Lues	34,60	94,51	51,60	92,56	59,84	24	137	97,39000	3,95000
14	Aceh Tamiang	27,40	100,00	58,00	98,54	44,55	28	282	98,00289	4,23289
15	Nagan Raya	28,80	97,57	57,60	93,92	45,43	47	275	96,49298	4,12484
16	Aceh Jaya	19,90	98,55	68,10	89,85	49,16	33	203	95,64580	4,78737
17	Bener Meriah	37,00	94,76	44,90	92,62	64,94	27	219	96,95252	4,75136
18	Pidie Jaya	37,80	97,11	77,80	100,00	35,06	48	228	96,24451	5,22835
19	Kota Banda Aceh	25,10	91,86	55,20	97,64	29,03	97	18	95,31667	5,55000
20	Kota Sabang	23,40	97,19	46,50	93,95	33,28	22	58	95,33657	5,88024
21	Kota Langsa	22,10	96,36	66,60	92,42	41,48	35	119	97,96410	4,47578
22	Kota Lhokseumawe	28,10	89,90	64,90	92,82	28,01	26	101	97,14132	5,18116
23	Kota Subulussalam	47,90	83,53	75,20	96,64	35,30	10	116	98,01652	2,64499

Lampiran 2 Peta Persebaran Setiap Variabel




Kota Sabang
Kota Banda Aceh
Aceh Besar
Pidie Jaya
Kota Lhokseumawe
Bireuen
Aceh Utara
Pidie
Aceh Jaya
Bener Meriah
Aceh Timur
Kota Langsa
Aceh Barat
Aceh Tengah
Nagan Raya
Aceh Tamiang
Gayo Lues
Aceh Barat Daya
Aceh Tenggara
Aceh Selatan
Simeulue
Kota Subulussalam
Aceh Singkil
N
W
E
S
Jumlah Tenaga Gizi
10 - 35 (rendah)
36 - 78 (sedang)
79 - 113 (tinggi)


Kota Sabang
Kota Banda Aceh
Aceh Besar
Pidie Jaya
Kota Lhokseumawe
Bireuen
Aceh Utara
Pidie
Aceh Jaya
Bener Meriah
Aceh Timur
Kota Langsa
Aceh Barat
Aceh Tengah
Nagan Raya
Aceh Tamiang
Gayo Lues
Aceh Barat Daya
Aceh Tenggara
Aceh Selatan
Simeulue
Kota Subulussalam
Aceh Singkil
N
W
E
S
Jumlah Posyandu
18 - 170 (rendah)
171 - 372 (sedang)
373 - 969 (tinggi)

Lampiran 3 Bandwith masing masing fungsi kernel setiap Kabupaten/kota

Fungsi Pembobot	Bandwith
Fixed Kernel Gaussian	1,271754
Fixed Kernel Tricube	3,587259
Fixed Kernel Bisquare	3,401132

Kabupaten/Kota	Adaptive Kernel Gaussian	Adaptive Kernel Tricube	Adaptive Kernel Bisquare
Simeulue	2,669330	2,991502	2,991436
Aceh Singkil	3,294532	4,088402	4,088349
Aceh Selatan	2,213620	3,025427	3,025377
Aceh Tenggara	2,407878	3,270424	3,270378
Aceh Timur	1,983461	2,514436	2,514408
Aceh Tengah	1,688735	2,155959	2,155922
Aceh Barat	1,811532	2,597654	2,597630
Aceh Besar	2,804409	3,785553	3,785527
Pidie	2,359551	3,429085	3,429053
Bireuen	1,622244	2,886249	2,886207
Aceh Utara	1,807742	2,623497	2,623482
Aceh Barat Daya	1,677765	2,435759	2,435710
Gayo Lues	1,888761	2,619075	2,619033
Aceh Tamiang	2,359528	2,991866	2,991837
Nagan Raya	1,552916	2,124036	2,124011
Aceh Jaya	2,255713	3,195407	3,195386
Bener Meriah	1,633162	2,360012	2,359969
Pidie Jaya	2,020661	3,132826	3,132791
Kota Banda Aceh	2,991245	3.965988	3,965963
Kota Sabang	3,134206	4,201177	4,201148
Kota Langsa	2,216978	2,857171	2,857145
Kota Lhokseumawe	1,881468	2,771801	2,771771
Kota Subulussalam	3,132709	3,966080	3,966030

Lampiran 4 T_hitung Parameter Parsial Model GWR

Kabupaten/Kota	X1	X2	X3	X4	X5	X6
Simeulue	|-1,8548|	|-0,4149|	|1,6285|	|0,4840|	|-3.1767|	|2,2568|
Aceh Singkil	|-1,2834|	|0,52474|	|0,4262|	|-0.3810|	|-2,5453|	|2,1148|
Aceh Selatan	|-2,1938|	|-0,2415|	|1,2196|	|0,8559|	|-2,6707|	|2,3076|
Aceh Tenggara	|-2,1817|	|-0,1219|	|0,9179|	|0,7595|	|-2,5002|	|2,2945|
Aceh Timur	|-3, 2231|	|-0,3685|	|2,1902|	|2,2434|	|-1,7890|	|2,4069|
Aceh Tengah	|-3, 2942|	|-0,3364|	|2,9215|	|2,4806|	|-2,1342|	|2,4710|
Aceh Barat	|-3, 3144|	|-0,3254|	|3,4140|	|2,7656|	|-2,2500|	|2,4635|
Aceh Besar	|-2, 6263|	|0,0855|	|3,2477|	|3,1215|	|-1,7345|	|2,1940|
Pidie	|-2, 9302|	|0,0883|	|3,3350|	|3,1509|	|-1,8171|	|2,3494|
Bireuen	|-3, 3823|	|-0,0203|	|3,2427|	|2,9938|	|-1,8404|	|2,4876|
Aceh Utara	|-3, 4812|	|-0,1980|	|2,8832|	|2,7002|	|-1,7623|	|2,4630|
Aceh Barat Daya	|-2, 7190|	|-0,4527|	|2,1386|	|1,6661|	|-2,4897|	|2,3970|
Gayo Lues	|-2, 7987|	|-0,3932|	| 1,8543|	|1,7233|	|-2,2404|	|2,3874|
Aceh Tamiang	|-2, 9725|	|-0,3885|	|1,5195|	|1,8436|	|-1,7860|	|2,3599|
Nagan Raya	|-3, 1340|	|-0,4670|	|3,0390|	|2,3093|	|-2,4029|	|2.4616|
Aceh Jaya	|-3, 0930|	|-0,1440|	|3,4993|	|3,0575|	|-2,0572|	|2,3456|
Bener Meriah	|-3, 4246|	|-0,2327|	|2,9807|	|2,6680|	|-1,9487|	|2,4778|
Pidie Jaya	|-3,1781|	|0,0337|	|3,3559|	|3,1051|	|-1,8832|	|2,4401|
Kota Banda Aceh	|-2, 4837|	|0,0873|	|3,1763|	|3,0934|	|-1,6795|	|2,1239|
Kota Sabang	|-2, 3172|	|0,1345|	|3,0682|	|3,0721|	|-1,5846|	|2,0538|

Kota Langsa	|-3,1483|	|-0,4084|	|1,8006|	|2,0839|	|-1,6524|	|2,3692|
Kota Lhokseumawe	|-3, 4904|	|-0,1150|	|3,0272|	|2,8303|	|-1,7324|	|2,4739|
Kota Subulussalam	|-1, 5527|	|0,4093|	|0,4073|	|-0,1199|	|-2,4714|	|2,1713|

keterangan : berwarna kuning menunjukkan nilai Thitung mempunyai nilai signifikan

Lampiran 5 Pemodelan GWR Setiap Kabupaten/Kota

Lokasi	Kabupaten/Kota	Model GWR
1	Simeule	$\hat{Y}_1 = 29{,}2041 - 0{,}4502X_{1.1} - 0{,}0403X_{1.2} + 0{,}5373X_{1.3} + 0{,}0594X_{1.4} - 0{,}1661X_{1.5} + 0{,}0118X_{1.6}$
2	Aceh Singkil	$\hat{Y}_2 = 56{,}2895 - 0{,}3437X_{2.1} + 0{,}0592X_{2.2} + 0{,}1464X_{2.3} - 0{,}0563X_{2.4} - 0{,}2001X_{2.5} + 0{,}0146X_{2.6}$
3	Aceh Selatan	$\hat{Y}_3 = 47{,}6873 - 0{,}5298X_{3.1} - 0{,}0223X_{3.2} + 0{,}3701X_{3.3} + 0{,}1034X_{3.4} - 0{,}1450X_{3.5} + 0{,}0132X_{3.6}$
4	Aceh Tenggara	$\hat{Y}_4 = 55{,}9206 - 0{,}5377X_{4.1} - 0.0116X_{4.2} + 0{,}2867X_{4.3} + 0{,}0942X_{4.4} - 0.1460X_{4.5} + 0{,}0138X_{4.6}$
5	Aceh Timur	$\hat{Y}_5 = 24{,}8823 - 0{,}7645X_{5.1} - 0{,}0342X_{5.2} + 0{,}7403X_{5.3} + 0{,}2645X_{5.4} - 0{,}0906X_{5.5} + 0{,}0130X_{5.6}$
6	Aceh Tengah	$\hat{Y}_6 = 1{,}56307 - 0{,}7646X_{6.1} - 0{,}0291X_{6.2} + 0{,}9823X_{6.3} + 0{,}2847X_{6.4} - 0{,}0994X_{6.5} + 0{,}0123X_{6.6}$
7	Aceh Barat	$\hat{Y}_7 = -19{,}9822 - 0{,}8151X_{7.1} - 0{,}0277X_{7.2} + 1{,}2465X_{7.3} + 0{,}3187X_{7.4} - 0{,}1015X_{7.5} + 0{,}0119X_{7.6}$
8	Aceh Besar	$\hat{Y}_8 = -38{,}1753 - 1{,}0037X_{8.1} + 0{,}0088X_{8.2} + 1{,}5575X_{8.3} + 0{,}4025X_{8.4} - 0{,}0848X_{8.5} + 0{,}0119X_{8.6}$
9	Pidie	$\hat{Y}_9 = -34{,}7044 - 0{,}9743X_{9.1} + 0{,}0085X_{9.2} + 1{,}4975X_{9.3} + 0{,}3893X_{9.4} - 0{,}0851X_{9.5} + 0{,}01187X_{9.6}$
10	Bireuen	$\hat{Y}_{10} = -20{,}3051 - 0{,}9115X_{10.1} - 0{,}0018X_{10.2} + 1{,}3012X_{10.3} + 0{,}3565X_{10.4} - 0{,}0836X_{10.5} + 0{,}0121X_{10.6}$
11	Aceh Utara	$\hat{Y}_{11} = -1{,}3598 - 0{,}8501X_{11.1} - 0{,}0179X_{11.2} + 1{,}0639X_{11.3} + 0{,}3207X_{11.4} - 0{,}0830X_{11.5} + 0{,}0125X_{11.6}$

12	Aceh Barat Daya	$\hat{Y}_{12} = 27,4745 - 0,6279X_{12.1} - 0,0397X_{12.2} + 0,6380X_{12.3} + 0,1905X_{12.4} - 0,1228X_{12.5} + 0,0127X_{12.6}$
13	Gayo Lues	$\hat{Y}_{13} = 35,4280 - 0,6564X_{13.1} - 0,0355X_{13.2} + 0,5683X_{13.3} + 0,1996X_{13.4} - 0,1144X_{13.5} + 0,0131X_{13.6}$
14	Aceh Tamiang	$\hat{Y}_{14} = 45,5475 - 0,7235X_{14.1} - 0,0378X_{14.2} + 0,5068X_{14.3} + 0,2205X_{14.4} - 0,0987X_{14.5} + 0,0136X_{14.6}$
15	Nagan Raya	$\hat{Y}_{15} = -0,2582 - 0,7201X_{15.1} - 0,0397X_{15.2} + 0,9832X_{15.3} + 0,2615X_{15.4} - 0,1114X_{15.5} + 0,01217X_{15.6}$
16	Aceh Jaya	$\hat{Y}_{16} = -35,5544 - 0,9197X_{16.1} - 0,0129X_{16.2} + 1,4786X_{16.3} + 0,3697X_{16.4} - 0,0938X_{16.5} + 0,01187X_{16.6}$
17	Bener Meriah	$\hat{Y}_{17} = -3,4068 - 0,8173X_{17.1} - 0,0205X_{17.2} + 1,0640X_{17.3} + 0,3110X_{17.4} - 0,0904X_{17.5} + 0,0123X_{17.6}$
18	Pidie Jaya	$\hat{Y}_{18} = -29,6641 - 0,9386X_{18.1} + 0,0030X_{18.2} + 1,4189X_{18.3} + 0,3733X_{18.4} - 0,0859X_{18.5} + 0,0119X_{18.6}$
19	Kota Banda Aceh	$\hat{Y}_{19} = -38,6754 - 1,0147X_{19.1} + 0,0094X_{19.2} + 1,5708X_{19.3} + 0,4077X_{19.4} - 0,0840X_{19.5} + 0,0119X_{19.6}$
20	Kota Sabang	$\hat{Y}_{20} = -38,3786 - 1,0228X_{20.1} + 0,0152X_{20.2} + 1,5689X_{20.3} + 0,4138X_{20.4} - 0,0818X_{20.5} + 0,0118X_{20.6}$
21	Kota Langsa	$\hat{Y}_{21} = 37,1094 - 0,7640X_{21.1} - 0,0396X_{21.2} + 0,6183X_{21.3} + 0,2496X_{21.4} - 0,0888X_{21.5} + 0,0134X_{21.6}$
22	Kota Lhokseumawe	$\hat{Y}_{22} = -8,7607 - 0,8883X_{22.1} - 0,0104X_{22.2} + 1,1663X_{22.3} + 0,3387X_{22.4} - 0,0804X_{22.5} + 0,0124X_{22.6}$
23	Kota Subulussalam	$\hat{Y}_{23} = 61,4518 - 0,4083X_{23.1} + 0,0444X_{23.2} + 0,1375X_{23.3} - 0,0170X_{23.4} - 0,1871X_{23.5} + 0,0148X_{23.6}$

Lampiran 6 Sintaks dan Output Rstudio

Packages

```
library(readxl)
library(car)

library(spgwr)

library(sp)
library(maptools)

library(foreign)
library(lattice)
library(zoo)

library(lmtest)
library(ape)
library(Matrix)
library(mvtnorm)
library(emulator)
```

Input Data

```
Skripsi <- read_excel("C:/Lampiran/Skripsi.xlsx",col_types = c("text", "
numeric", "numeric", "numeric", "numeric", "numeric", "numeric", "
```

Lampiran 6.1 Analisis Deskriptif

```
attach(Skripsi)
summary(Skripsi)

##  Kabupaten/Kota          Y               X1               X2
##  Length:23          Min.   :19.90   Min.   : 79.98   Min.   :41.10
##  Class :character   1st Qu.:26.05   1st Qu.: 94.57   1st Qu.:51.30
##  Mode  :character   Median :32.00   Median : 97.19   Median :58.00
##                     Mean   :30.98   Mean   : 95.46   Mean   :59.43
##                     3rd Qu.:35.95   3rd Qu.: 98.27   3rd Qu.:67.35
##                     Max.   :47.90   Max.   :100.00   Max.   :86.70
##        X3                X4              X5               X6
##  Min.   : 83.50   Min.   :28.01   Min.   : 10.00   Min.   : 18.0
##  1st Qu.: 92.59   1st Qu.:35.18   1st Qu.: 27.50   1st Qu.:128.0
##  Median : 93.95   Median :40.64   Median : 47.00   Median :219.0
##  Mean   : 94.37   Mean   :41.92   Mean   : 50.48   Mean   :311.9
##  3rd Qu.: 97.22   3rd Qu.:47.30   3rd Qu.: 70.00   3rd Qu.:348.0
##  Max.   :100.00   Max.   :64.94   Max.   :113.00   Max.   :969.0
```

```
##        u               v
##  Min.   :95.32   Min.   :2.359
##  1st Qu.:96.09   1st Qu.:3.873
##  Median :96.95   Median :4.476
##  Mean   :96.80   Mean   :4.377
##  3rd Qu.:97.50   3rd Qu.:5.202
##  Max.   :98.02   Max.   :5.880
```

Analisis Dekriptif (Standar Deviasi)

```
sd(Skripsi$Y)

## [1] 6.978601

sd(Skripsi$X1)

## [1] 5.004568

sd(Skripsi$X2)

## [1] 12.18998

sd(Skripsi$X3)

## [1] 3.647664

sd(Skripsi$X4)

## [1] 9.52789

sd(Skripsi$X5)

## [1] 29.04521

sd(Skripsi$X6)

## [1] 254.2825
```

#Analisis Regresi Linier Berganda

Lampiran 6.2 Regresi OLS

```
regOLS=lm(Y~X1+X2+X3+X4+X5+X6)
summary(regOLS)
```

```
##
## Call:
## lm(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.6457 -3.9749 -0.6852  3.6003  9.8987
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 40.394129  43.319061   0.932   0.3649
## X1          -0.740454   0.283926  -2.608   0.0190 *
## X2          -0.049163   0.106121  -0.463   0.6494
## X3           0.616455   0.371529   1.659   0.1165
## X4           0.191156   0.140740   1.358   0.1932
## X5          -0.117155   0.054668  -2.143   0.0478 *
## X6           0.012570   0.006133   2.050   0.0572 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 5.706 on 16 degrees of freedom
## Multiple R-squared:  0.5138, Adjusted R-squared:  0.3315
## F-statistic: 2.818 on 6 and 16 DF,  p-value: 0.04562
```

Lampiran 6.3 Deteksi Multikolinearitas

```
vif(regOLS)

   X1        X2        X3        X4        X5       X6

1.364378  1.130829  1.241103  1.215123  1.703744  1.643702
```

Lampiran 6.4 Uji Asumsi Residual

Uji Asumsi Residual Identik

```
bptest(regOLS)

##
##  studentized Breusch-Pagan test
##
## data:  regOLS
## BP = 12.382, df = 6, p-value = 0.05398
```

Uji Asumsi Residual Independen

```
dwtest(regOLS)
```

```
##
##  Durbin-Watson test
##
## data:  regOLS
## DW = 1.4096, p-value = 0.03142
## alternative hypothesis: true autocorrelation is greater than 0
```

Uji Asumsi Residual Distribusi Normal

```
resid<-abs(regOLS$residuals)
res=regOLS$residual
res
```

```
##         1          2          3          4          5          6
        7
##  4.4326980  9.8986789  6.7500779 -4.5192342 -1.0717414  4.23400
75 -2.8205121
##         8          9         10         11         12         13
       14
##  0.5875207 -4.1701306 -3.7795763  2.9666841  2.2613391 -0.68518
92 -5.6231557
##        15         16         17         18         19         20
        21
## -1.0483857 -7.6456696 -0.1206571  7.5463093  0.8357013 -5.17252
66 -5.9670010
##        22         23
## -3.3337537  6.4445164
```

```
ks.test(res,"pnorm",mean(res),sd(res),alternative=c("two.sided"))
```

```
##
##  Exact one-sample Kolmogorov-Smirnov test
##
## data:  res
## D = 0.11023, p-value = 0.914
## alternative hypothesis: two-sided
```

AIC OLS

```
AIC(regOLS)
```

```
## [1] 153.0325
```

#Geographically Weighted Regression

Lampiran 6.5 Bandwith dan CV

```
fixgauss=gwr.sel(Y~X1+X2+X3+X4+X5+X6,data=Skripsi,adapt=FALSE,coords=cbind(Skripsi$u,Skripsi$v),gweight=gwr.Gauss)

## Bandwidth: 1.697601 CV score: 1209.52

## Bandwidth: 2.744034 CV score: 1274.951

## Bandwidth: 1.05087 CV score: 1215.369

## Bandwidth: 1.481206 CV score: 1194.8

## Bandwidth: 1.399483 CV score: 1190.585

## Bandwidth: 1.266325 CV score: 1187.374

## Bandwidth: 1.238556 CV score: 1187.686

## Bandwidth: 1.277984 CV score: 1187.376

## Bandwidth: 1.271835 CV score: 1187.366

## Bandwidth: 1.271794 CV score: 1187.366

## Bandwidth: 1.271754 CV score: 1187.366

## Bandwidth: 1.26968 CV score: 1187.367

## Bandwidth: 1.271713 CV score: 1187.366

## Bandwidth: 1.271754 CV score: 1187.366
```

Lampiran 6.6 Matriks Jarak

```
U<-as.matrix(Skripsi$u)

V<-as.matrix(Skripsi$v)

j<-nrow(V)

i<-nrow(U)
```

```
jarak<-matrix(0,23,23)
for (i in 1:23){
 for (j in 1:23){
     jarak[i,j]<-sqrt((U[i,]-U[j,])^2+(V[i,]-V[j,])^2)
   }
}
 jarak
```

```
         [,1]      [,2]      [,3]      [,4]       [,5]      [,6]
         [,7]      [,8]      [,9]      [,10]      [,11]
 [1,] 0.000000  1.8684538 1.4846195 1.7999593 2.4583423 1.9775748
      1.8147601 2.8618611 2.7279223 2.6693130 2.6234361
 [2,] 1.868454  0.0000000 1.0854930 0.9657135 2.1791203 2.3325401
      2.7105250 3.9122509 3.5803437 3.0872950 2.6991264
 [3,] 1.484620  1.0854930 0.0000000 0.3465810 1.2384544 1.2486188
      1.6563262 2.8455313 2.4988130 2.0131567 1.6721502
 [4,] 1.799959  0.9657135 0.3465810 0.0000000 1.2166446 1.4294103
      1.9236980 3.0866375 2.7122904 2.1500482 1.7363109
 [5,] 2.458342  2.1791203 1.2384544 1.2166446 0.0000000 0.7798549
      1.4603135 2.3277168 1.8780828 1.1353586 0.5997311
 [6,] 1.977575  2.3325401 1.2486188 1.4294103 0.7798549 0.0000000
      0.6824275 1.6886807 1.2881392 0.7827552 0.6565766
 [7,] 1.814760  2.7105250 1.6563262 1.9236980 1.4603135 0.6824275
      0.0000000 1.2053224 0.9414908 0.9530611 1.1910754
 [8,] 2.861861  3.9122509 2.8455313 3.0866375 2.3277168 1.6886807
```

```
      1.2053224 0.0000000 0.4652793 1.2608173 1.8076893
 [9,] 2.727922  3.5803437 2.4988130 2.7122904 1.8780828 1.2881392
      0.9414908 0.4652793 0.0000000 0.7955505 1.3447892
[10,] 2.669313  3.0872950 2.0131567 2.1500482 1.1353586 0.7827552
      0.9530611 1.2608173 0.7955505 0.0000000 0.5604928
[11,] 2.623436  2.6991264 1.6721502 1.7363109 0.5997311 0.6565766
      1.1910754 1.8076893 1.3447892 0.5604928 0.0000000
[12,] 1.513552  1.6777636 0.5949501 0.8459611 0.9448256 0.6741626
      1.0781597 2.2543859 1.9039598 1.4548641 1.2017342
[13,] 1.888748  1.6625075 0.6396443 0.7113757 0.6137443 0.7457755
      1.3361160 2.4321474 2.0328796 1.4390217 1.0422390
[14,] 2.536617  1.8784954 1.1282940 0.9729501 0.4868989 1.1874841
      1.8633881 2.8043972 2.3595104 1.6221315 1.0796773
[15,] 1.552882  2.2406523 1.1827249 1.4554841 1.1870023 0.4707956
      0.4736214 1.6716503 1.3645604 1.1199551 1.1227814
[16,] 2.176782  3.2945310 2.2556885 2.5295142 1.9834041 1.2367045
      0.6065503 0.6864286 0.6511366 1.1563296 1.5879081
[17,] 2.302243  2.5630809 1.4941521 1.6238426 0.6975438 0.3250473
      0.8532160 1.6331080 1.1904532 0.5262430 0.3526294
[18,] 2.593633  3.2988966 2.2136079 2.4078427 1.5384411 0.9784324
      0.7794995 0.7989377 0.3399307 0.4728242 1.0090222
[19,] 2.991245  4.0881989 3.0252332 3.2702454 2.5143269 1.8760227
      1.3782471 0.1881032 0.6445442 1.4384937 1.9892952
[20,] 3.308800  4.3392067 3.2648055 3.4913277 2.6492708 2.0727128
      1.6429978 0.4500502 0.7866772 1.5295506 2.0900392
[21,] 2.667098  2.1188298 1.3155319 1.1968189 0.3557494 1.1293373
```

```
      1.8115307 2.6714395 2.2169429 1.4531124 0.8963067
[22,] 2.771685  2.9153111 1.8814519 1.9533661 0.8092895 0.7943012
      1.2270878 1.6855914 1.2203979 0.4260027 0.2180612
[23,] 1.990947  0.3204106 0.9414271 0.7362335 1.9206258 2.1558158
      2.5975624 3.7854508 3.4289626 2.8860864 2.4651397

          [,12]     [,13]     [,14]     [,15]     [,16]     [,17]
          [,18]     [,19]     [,20]     [,21]     [,22]
 [1,] 1.5135521 1.8887476 2.5366169 1.5528816 2.1767817 2.3022426
      2.5936329 2.9912452 3.3088001 2.6670979 2.7716848
 [2,] 1.6777636 1.6625075 1.8784954 2.2406523 3.2945310 2.5630809
      3.2988966 4.0881989 4.3392067 2.1188298 2.9153111
 [3,] 0.5949501 0.6396443 1.1282940 1.1827249 2.2556885 1.4941521
      2.2136079 3.0252332 3.2648055 1.3155319 1.8814519
 [4,] 0.8459611 0.7113757 0.9729501 1.4554841 2.5295142 1.6238426
      2.4078427 3.2702454 3.4913277 1.1968189 1.9533661
 [5,] 0.9448256 0.6137443 0.4868989 1.1870023 1.9834041 0.6975438
      1.5384411 2.5143269 2.6492708 0.3557494 0.8092895
 [6,] 0.6741626 0.7457755 1.1874841 0.4707956 1.2367045 0.3250473
      0.9784324 1.8760227 2.0727128 1.1293373 0.7943012
 [7,] 1.0781597 1.3361160 1.8633881 0.4736214 0.6065503 0.8532160
      0.7794995 1.3782471 1.6429978 1.8115307 1.2270878
 [8,] 2.2543859 2.4321474 2.8043972 1.6716503 0.6864286 1.6331080
      0.7989377 0.1881032 0.4500502 2.6714395 1.6855914
 [9,] 1.9039598 2.0328796 2.3595104 1.3645604 0.6511366 1.1904532
      0.3399307 0.6445442 0.7866772 2.2169429 1.2203979
```

```
[10,] 1.4548641 1.4390217 1.6221315 1.1199551 1.1563296 0.5262430
      0.4728242 1.4384937 1.5295506 1.4531124 0.4260027
[11,] 1.2017342 1.0422390 1.0796773 1.1227814 1.5879081 0.3526294
      1.0090222 1.9892952 2.0900392 0.8963067 0.2180612
[12,] 0.0000000 0.4128230 1.0875138 0.6098869 1.6836185 0.9565614
      1.6222783 2.4355686 2.6706584 1.1738769 1.3913356
[13,] 0.4128230 0.0000000 0.6750244 0.9139006 1.9347962 0.9129986
      1.7164864 2.6189138 2.8182244 0.7784842 1.2560277
[14,] 1.0875138 0.6750244 0.0000000 1.5137698 2.4214337 1.1713608
      2.0206054 2.9917512 3.1341683 0.2459704 1.2812209
[15,] 0.6098869 0.9139006 1.5137698 0.0000000 1.0754834 0.7769853
      1.1311348 1.8479152 2.1020714 1.5124014 1.2394215
[16,] 1.6836185 1.9347962 2.4214337 1.0754834 0.0000000 1.3072230
      0.7435863 0.8306219 1.1357768 2.3391525 1.5465045
[17,] 0.9565614 0.9129986 1.1713608 0.7769853 1.3072230 0.0000000
      0.8536981 1.8203972 1.9712072 1.0484460 0.4694423
[18,] 1.6222783 1.7164864 2.0206054 1.1311348 0.7435863 0.8536981
      0.0000000 0.9820127 1.1177248 1.8770621 0.8980544
[19,] 2.4355686 2.6189138 2.9917512 1.8479152 0.8306219 1.8203972
      0.9820127 0.0000000 0.3308405 2.8570720 1.8615601
[20,] 2.6706584 2.8182244 3.1341683 2.1020714 1.1357768 1.9712072
      1.1177248 0.3308405 0.0000000 2.9793311 1.9354131
[21,] 1.1738769 0.7784842 0.2459704 1.5124014 2.3391525 1.0484460
      1.8770621 2.8570720 2.9793311 0.0000000 1.0837590
[22,] 1.3913356 1.2560277 1.2812209 1.2394215 1.5465045 0.4694423
      0.8980544 1.8615601 1.9354131 1.0837590 0.0000000
```

```
[23,] 1.5313604 1.4476090 1.5879525 2.1239414 3.1953267 2.3598475
      3.1326910 3.9658892 4.2010648 1.8315373 2.6829343
        [,23]
 [1,] 1.9909473
 [2,] 0.3204106
 [3,] 0.9414271
 [4,] 0.7362335
 [5,] 1.9206258
 [6,] 2.1558158
 [7,] 2.5975624
 [8,] 3.7854508
 [9,] 3.4289626
[10,] 2.8860864
[11,] 2.4651397
[12,] 1.5313604
[13,] 1.4476090
[14,] 1.5879525
[15,] 2.1239414
[16,] 3.1953267
[17,] 2.3598475
[18,] 3.1326910
[19,] 3.9658892
[20,] 4.2010648
[21,] 1.8315373
[22,] 2.6829343
[23,] 0.0000000
```

Lampiran 6.7 Matriks Wij

```
h<-as.matrix(gwr.fixgauss$bandwidth)

i<-nrow(h)

W<-matrix(0,23,23)

for (i in 1:23) {

  for (j in 1:23) {

    W[i,j]<-exp(-(1/2)*(jarak[i,j]/h)**2)

  }

}

W
```

```
           [,1]        [,2]          [,3]       [,4]        [,5]
           [,6]        [,7]          [,8]       [,9]       [,10]
 [1,] 1.00000000  0.339844727  0.50591446   0.36729555  0.1543845
      0.2984927   0.3612706    0.079501088  0.10020570  0.11050014
 [2,] 0.33984473  1.000000000  0.69470677   0.74952878  0.2303856
      0.1860044   0.1031800    0.008811465  0.01900786  0.05251831
 [3,] 0.50591446  0.694706771  1.00000000   0.96354686  0.6224083
      0.6175631   0.4282206    0.081825041  0.14510038  0.28567292
 [4,] 0.36729555  0.749528777  0.96354686   1.00000000  0.6327969
      0.5317128   0.3185325    0.052584267  0.10287505  0.23952619
 [5,] 0.15438454  0.230385576  0.62240829   0.63279694  1.0000000
      0.8286026   0.5172344    0.187301390  0.33607563  0.67132522
 [6,] 0.29849275  0.186004357  0.61756308   0.53171279  0.8286026
      1.0000000   0.8659123    0.414130348  0.59871649  0.82744249
```

```
 [7,] 0.36127062  0.103179979  0.42822057   0.31853248  0.5172344
      0.8659123   1.0000000    0.638184219  0.76031024  0.75517528
 [8,] 0.07950109  0.008811465  0.08182504   0.05258427  0.1873014
      0.4141303   0.6381842    1.000000000  0.93526491  0.61174642
 [9,] 0.10020570  0.019007864  0.14510038   0.10287505  0.3360756
      0.5987165   0.7603102    0.935264911  1.00000000  0.82229271
[10,] 0.11050014  0.052518315  0.28567292   0.23952619  0.6713252
      0.8274425   0.7551753    0.611746423  0.82229271  1.00000000
[11,] 0.11911413  0.105165727  0.42130446   0.39376286  0.8947661
      0.8752281   0.6449557    0.364142626  0.57173598  0.90744805
[12,] 0.49252774  0.418862415  0.89634746   0.80152384  0.7588331
      0.8689189   0.6981228    0.207803956  0.32605979  0.51978082
[13,] 0.33192768  0.425513395  0.88118685   0.85517845  0.8900747
      0.8420286   0.5758606    0.160621387  0.27871167  0.52720022
[14,] 0.13680779  0.335914653  0.67465233   0.74628503  0.9293318
      0.6466612   0.3418367    0.087920275  0.17886812  0.44332165
[15,] 0.47450269  0.211807891  0.64892017   0.51949098  0.6468899
      0.9337731   0.9330030    0.421522217  0.56234597  0.67857390
[16,] 0.23111224  0.034893566  0.20742690   0.13833815  0.2963697
      0.6232423   0.8924936    0.864447412  0.87715509  0.66142489
[17,] 0.19425682  0.131217359  0.50149283   0.44256107  0.8603462
      0.9678646   0.7984751    0.438451577  0.64525127  0.91794998
[18,] 0.12497952  0.034584440  0.21984445   0.16657011  0.4810964
      0.7438209   0.8287446    0.820920913  0.96490779  0.93322068
[19,] 0.06290683  0.005702360  0.05905316   0.03665645  0.1416533
      0.3368801   0.5558575    0.989121139  0.87947437  0.52744792
```

```
[20,] 0.03389182  0.002965155  0.03706154   0.02309135  0.1142022
      0.2649710   0.4340818    0.939304014  0.82586948  0.48517029
[21,] 0.11090467  0.249600596  0.58565999   0.64222700  0.9616307
      0.6741613   0.3625809    0.110112858  0.21884253  0.52060000
[22,] 0.09302058  0.072262810  0.33476222   0.30740461  0.8167068
      0.8227978   0.6278241    0.415467073  0.63101011  0.94544144
[23,] 0.29363560  0.968760486  0.76033841   0.84571780  0.3196976
      0.2376943   0.1241939    0.011915045  0.02638724  0.07615140

          [,11]       [,12]        [,13]        [,14]       [,15]
          [,16]       [,17]        [,18]        [,19]       [,20]
 [1,] 0.1191141   0.4925277  0.33192768 0.13680779   0.4745027
      0.23111224  0.1942568  0.12497952 0.062906826  0.0338918
 [2,] 0.1051657   0.4188624  0.42551340 0.33591465   0.2118079
      0.03489357  0.1312174  0.03458444 0.005702360  0.002965155
 [3,] 0.4213045   0.8963475  0.88118685 0.67465233   0.6489202
      0.20742690  0.5014928  0.21984445 0.059053160  0.037061535
 [4,] 0.3937629   0.8015238  0.85517845 0.74628503   0.5194910
      0.13833815  0.4425611  0.16657011 0.036656451  0.023091345
 [5,] 0.8947661   0.7588331  0.89007475 0.92933178   0.6468899
      0.29636966  0.8603462  0.48109642 0.141653289  0.114202201
 [6,] 0.8752281   0.8689189  0.84202863 0.64666120   0.9337731
      0.62324228  0.9678646  0.74382095 0.336880146  0.264970994

 [7,] 0.6449557   0.6981228  0.57586058 0.34183667   0.9330030
      0.89249363  0.7984751  0.82874460 0.555857490  0.434081810
```

```
 [8,] 0.3641426   0.2078040   0.16062139  0.08792027   0.4215222
      0.86444741  0.4384516   0.82092091  0.989121139  0.939304014
 [9,] 0.5717360   0.3260598   0.27871167  0.17886812   0.5623460
      0.87715509  0.6452513   0.96490779  0.879474371  0.825869481
[10,] 0.9074481   0.5197808   0.52720022  0.44332165   0.6785739
      0.66142489  0.9179500   0.93322068  0.527447917  0.485170293
[11,] 1.0000000   0.6398905   0.71475615  0.69741637   0.6772455
      0.45863646  0.9622879   0.72997153  0.294233132  0.259128241
[12,] 0.6398905   1.0000000   0.94867826  0.69376431   0.8913745
      0.41632170  0.7536164   0.44325637  0.159796587  0.110254995
[13,] 0.7147562   0.9486783   1.00000000  0.86860662   0.7724382
      0.31434343  0.7728317   0.40218407  0.119990322  0.085832339
[14,] 0.6974164   0.6937643   0.86860662  1.00000000   0.4924274
      0.16322432  0.6543092   0.28303166  0.062847978  0.047990765
[15,] 0.6772455   0.8913745   0.77243816  0.49242737   1.0000000
      0.69936784  0.8297478   0.67331494  0.347959370  0.255118882
[16,] 0.4586365   0.4163217   0.31434343  0.16322432   0.6993678
      1.00000000  0.5896189   0.84287778  0.807921709  0.671128114
[17,] 0.9622879   0.7536164   0.77283175  0.65430921   0.8297478
      0.58961887  1.0000000   0.79827199  0.358989222  0.300822021
[18,] 0.7299715   0.4432564   0.40218407  0.28303166   0.6733149
      0.84287778  0.7982720   1.00000000  0.742208687  0.679621644
[19,] 0.2942331   0.1597966   0.11999032  0.06284798   0.3479594
      0.80792171  0.3589892   0.74220869  1.000000000  0.966728368
[20,] 0.2591282   0.1102550  0.08583234  0.04799076  0.2551189
      0.67112811  0.3008220  0.67962164  0.966728368 1.000000000
```

```
[21,] 0.7800810   0.6531167  0.82914994  0.98147004  0.4930582
      0.18423649  0.7118945  0.33647411  0.080177085 0.064305516
[22,] 0.9854074   0.5496630  0.61403043  0.60201564  0.6219474
      0.47741092  0.9341405  0.77932513  0.342557030 0.314111479
[23,] 0.1527955   0.4843401  0.52317560  0.45861647  0.2479327
      0.04257800  0.1787802  0.04812831  0.007732389 0.004270156

         [,21]        [,22]       [,23]
 [1,] 0.11090467  0.09302058  0.293635600
 [2,] 0.24960060  0.07226281  0.968760486
 [3,] 0.58565999  0.33476222  0.760338407
 [4,] 0.64222700  0.30740461  0.845717802
 [5,] 0.96163068  0.81670676  0.319697618
 [6,] 0.67416128  0.82279781  0.237694272
 [7,] 0.36258091  0.62782412  0.124193851
 [8,] 0.11011286  0.41546707  0.011915045
 [9,] 0.21884253  0.63101011  0.026387244
[10,] 0.52060000  0.94544144  0.076151405
[11,] 0.78008102  0.98540741  0.152795495
[12,] 0.65311667  0.54966303  0.484340142
[13,] 0.82914994  0.61403043  0.523175603
[14,] 0.98147004  0.60201564  0.458616467
[15,] 0.49305817  0.62194737  0.247932698
[16,] 0.18423649  0.47741092  0.042577997
[17,] 0.71189448  0.93414050  0.178780191
[18,] 0.33647411  0.77932513  0.048128311
```

```
[19,] 0.08017709  0.34255703  0.007732389

[20,] 0.06430552  0.31411148  0.004270156

[21,] 1.00000000  0.69551507  0.354502495

[22,] 0.69551507  1.00000000  0.108037517

[23,] 0.35450249  0.10803752  1.000000000
```

Lampiran 6.8 Fungsi Pembobot

Fungsi Pembobot *Fixed Kernel Gaussian*

```
gwr.fixgauss=gwr(Y~X1+X2+X3+X4+X5+X6,data=Skripsi,bandwidth
=fixgauss,coords=cbind(Skripsi$u,Skripsi$v),hatmatrix=TRUE,gweight
=gwr.Gauss)
gwr.fixgauss

## Call:
## gwr(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6, data = Skripsi,
##     coords = cbind(Skripsi$u, Skripsi$v), bandwidth = fixgauss,

##     gweight = gwr.Gauss, hatmatrix = TRUE)
## Kernel function: gwr.Gauss
## Fixed bandwidth: 1.271754
## Summary of GWR coefficient estimates at data points:
##                     Min.    1st Qu.     Median    3rd Qu.
Max.  Global
## X.Intercept. -38.675468 -24.984626  -0.258260  36.268774  61.45
1897 40.3941
## X1           -1.022855  -0.915640  -0.764602  -0.642173  -0.34
3772 -0.7405
## X2           -0.040370  -0.034900  -0.017969   0.005796   0.05
9221 -0.0492
## X3            0.137512   0.552886   0.983256   1.360096   1.57
0806  0.6165
## X4           -0.056337   0.195067   0.284700   0.363177   0.41
3882  0.1912
## X5           -0.200189  -0.118665  -0.093862  -0.085020  -0.08
0434 -0.1172
## X6            0.011845   0.011936   0.012397   0.013185   0.01
4817  0.0126
## Number of data points: 23
## Effective number of parameters (residual: 2traceS - traceS'S):
13.72814
## Effective degrees of freedom (residual: 2traceS - traceS'S): 9.
271856
```

```
## Sigma (residual: 2traceS - traceS'S): 4.890386
## Effective number of parameters (model: traceS): 11.6238
## Effective degrees of freedom (model: traceS): 11.3762
## Sigma (model: traceS): 4.414971
## Sigma (ML): 3.105007
## AICc (GWR p. 61, eq 2.33; p. 96, eq. 4.21): 179.3228
## AIC (GWR p. 96, eq. 4.22): 129.0137
## Residual sum of squares: 221.7446
## Quasi-global R2: 0.7930366
```

Fungsi Pembobot *Adaptive Kernel Gaussian*

```
gwr.adaptgauss=gwr(Y~X1+X2+X3+X4+X5+X6,data=Skripsi,adapt=a
daptgauss,coords=cbind(Skripsi$u,Skripsi$v),hatmatrix=TRUE,gweigh
t=gwr.Gauss)
gwr.adaptgauss
```

```
## Call:
## gwr(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6, data = Skripsi,
##     coords = cbind(Skripsi$u, Skripsi$v), gweight = gwr.Gauss,
##     adapt = adaptgauss, hatmatrix = TRUE)
## Kernel function: gwr.Gauss
## Adaptive quantile: 0.7826213 (about 18 of 23 data points)
## Summary of GWR coefficient estimates at data points:
##                    Min.   1st Qu.    Median   3rd Qu.      Max.
Global
## X.Intercept. -4.345636 11.018067 16.027905 38.264148 48.970645
40.3941
## X1          -0.844678 -0.801023 -0.746977 -0.678239 -0.656730
-0.7405
## X2          -0.056542 -0.046187 -0.040444 -0.035108 -0.019498
-0.0492
## X3           0.484244  0.597603  0.861257  0.917439  1.101096
0.6165
## X4           0.144938  0.187194  0.246952  0.265038  0.312598
0.1912
## X5          -0.131770 -0.121044 -0.106387 -0.100388 -0.090395
-0.1172
## X6           0.012051  0.012143  0.012381  0.012809  0.012928
0.0126
## Number of data points: 23
## Effective number of parameters (residual: 2traceS - traceS'S):
9.759895
## Effective degrees of freedom (residual: 2traceS - traceS'S):
13.2401
## Sigma (residual: 2traceS - traceS'S): 5.404503
```

```
## Effective number of parameters (model: traceS): 8.549805
## Effective degrees of freedom (model: traceS): 14.45019
## Sigma (model: traceS): 5.173264
## Sigma (ML): 4.100507
## AICc (GWR p. 61, eq 2.33; p. 96, eq. 4.21): 165.4661
## AIC (GWR p. 96, eq. 4.22): 138.7321
## Residual sum of squares: 386.7256
## Quasi-global R2: 0.6390529
```

Fungsi Pembobot *Fixed Kernel Tricube*

```
gwr.fixtricube=gwr(Y~X1+X2+X3+X4+X5+X6,data=Skripsi,bandwidt
h=fixtricube,coords=cbind(Skripsi$u,Skripsi$v),hatmatrix=TRUE,gwei
ght=gwr.tricube)
gwr.fixtricube

## Call:
## gwr(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6, data = Skripsi,
##     coords = cbind(Skripsi$u, Skripsi$v), bandwidth = fixtricub
e,
##     gweight = gwr.tricube, hatmatrix = TRUE)
## Kernel function: gwr.tricube
## Fixed bandwidth: 3.587259
## Summary of GWR coefficient estimates at data points:
##                      Min.    1st Qu.     Median    3rd Qu.
Max.  Global
## X.Intercept. -43.300511 -26.051769  11.704930  36.901109  64.15
9948 40.3941
## X1            -1.124586  -0.871746  -0.752999  -0.667315  -0.43
2225 -0.7405
## X2            -0.055876  -0.040564  -0.027804  -0.007472   0.01
9958 -0.0492
## X3             0.170539   0.546017   0.889091   1.345550   1.59
1277  0.6165
## X4            -0.015788   0.176535   0.251953   0.361463   0.41
8104  0.1912
## X5            -0.170095  -0.127254  -0.104179  -0.087623  -0.07
8780 -0.1172
## X6             0.011826   0.012130   0.012422   0.013147   0.01
4832  0.0126
## Number of data points: 23
## Effective number of parameters (residual: 2traceS - traceS'S):
11.08485
## Effective degrees of freedom (residual: 2traceS - traceS'S): 1
1.91515
## Sigma (residual: 2traceS - traceS'S): 4.855056
## Effective number of parameters (model: traceS): 9.891539
## Effective degrees of freedom (model: traceS): 13.10846
```

```
## Sigma (model: traceS): 4.628796
## Sigma (ML): 3.494459
## AICc (GWR p. 61, eq 2.33; p. 96, eq. 4.21): 167.9271
## AIC (GWR p. 96, eq. 4.22): 132.7169
## Residual sum of squares: 280.8587
## Quasi-global R2: 0.7378629
```

Fungsi Pembobot *Adaptive Kernel Bisquare*

```
gwr.adapttricube=gwr(Y~X1+X2+X3+X4+X5+X6,data=Skripsi,adapt=
adapttricube,coords=cbind(Skripsi$u,Skripsi$v),hatmatrix=TRUE,gwei
ght=gwr.tricube)
gwr.adapttricube

## Call:
## gwr(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6, data = Skripsi,
##     coords = cbind(Skripsi$u, Skripsi$v), gweight = gwr.tricub
e,
##     adapt = adapttricube, hatmatrix = TRUE)
## Kernel function: gwr.tricube
## Adaptive quantile: 0.9565569 (about 22 of 23 data points)
## Summary of GWR coefficient estimates at data points:
##                     Min.     1st Qu.      Median     3rd Qu.
     Max.
## X.Intercept. -45.9809051 -34.6574095 -20.5427304  34.1283015  6
0.5777282
## X1            -0.9988692  -0.9609907  -0.8298003  -0.6271113  -
0.3126257
## X2            -0.0392575  -0.0248123  -0.0071133   0.0014896
0.0123972
## X3             0.2658873   0.4832477   1.2711679   1.4606191
1.5604172
## X4            -0.0400716   0.2028946   0.3663416   0.3835738
0.3942889
## X5            -0.1912597  -0.1237462  -0.0915944  -0.0814687  -
0.0664120
## X6             0.0117910   0.0122819   0.0124940   0.0142012
0.0147352
##                 Global
## X.Intercept. 40.3941
## X1           -0.7405
## X2           -0.0492
## X3            0.6165
## X4            0.1912
## X5           -0.1172
## X6            0.0126
## Number of data points: 23
## Effective number of parameters (residual: 2traceS - traceS'S):
```

```
12.4826
## Effective degrees of freedom (residual: 2traceS - traceS'S): 1
0.5174
## Sigma (residual: 2traceS - traceS'S): 5.071284
## Effective number of parameters (model: traceS): 10.97504
## Effective degrees of freedom (model: traceS): 12.02496
## Sigma (model: traceS): 4.74275
## Sigma (ML): 3.429321
## AICc (GWR p. 61, eq 2.33; p. 96, eq. 4.21): 176.9078
## AIC (GWR p. 96, eq. 4.22): 132.9349
## Residual sum of squares: 270.4856
## Quasi-global R2: 0.7475445
```

Fungsi Pembobot *Fixed Kernel Bisquare*

```
gwr.fixbisquare=gwr(Y~X1+X2+X3+X4+X5+X6,
   data=Skripsi,bandwidth=fixbisquare,coords=cbind(Skripsi$u,Skripsi
$v),hatmatrix=TRUE,gweight=gwr.bisquare)
gwr.fixbisquare
```

```
## Call:
## gwr(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6, data = Skripsi,
##     coords = cbind(Skripsi$u, Skripsi$v), bandwidth = fixbisqua
re,
##     gweight = gwr.bisquare, hatmatrix = TRUE)
## Kernel function: gwr.bisquare
## Fixed bandwidth: 3.401132
## Summary of GWR coefficient estimates at data points:
##                     Min.     1st Qu.      Median     3rd Qu.
     Max.
## X.Intercept. -4.6094e+01 -2.8090e+01  7.2237e+00  3.6909e+01
6.4056e+01
## X1           -1.1153e+00 -8.9475e-01 -7.5792e-01 -6.5561e-01 -
3.8616e-01
## X2           -4.9101e-02 -3.4594e-02 -2.4639e-02 -7.4769e-04
4.1797e-02
## X3            1.3975e-01  5.4542e-01  9.3018e-01  1.3962e+00
1.5873e+00
## X4           -4.2764e-02  1.8338e-01  2.6622e-01  3.7105e-01
4.2035e-01
## X5           -1.8372e-01 -1.2411e-01 -1.0202e-01 -8.6193e-02 -
7.8552e-02
## X6            1.1826e-02  1.2109e-02  1.2356e-02  1.3260e-02
1.5090e-02
##               Global
## X.Intercept. 40.3941
## X1           -0.7405
## X2           -0.0492
```

```
## X3            0.6165
## X4            0.1912
## X5           -0.1172
## X6            0.0126
## Number of data points: 23
## Effective number of parameters (residual: 2traceS - traceS'S):
12.38186
## Effective degrees of freedom (residual: 2traceS - traceS'S): 1
0.61814
## Sigma (residual: 2traceS - traceS'S): 4.845392
## Effective number of parameters (model: traceS): 10.75591
## Effective degrees of freedom (model: traceS): 12.24409
## Sigma (model: traceS): 4.512216
## Sigma (ML): 3.292222
## AICc (GWR p. 61, eq 2.33; p. 96, eq. 4.21): 172.8718
## AIC (GWR p. 96, eq. 4.22): 130.839
## Residual sum of squares: 249.2907
## Quasi-global R2: 0.7673266
```

Fungsi Pembobot *Adaptive Kernel Bisquare*

```
gwr.adaptbisquare=gwr(Y~X1+X2+X3+X4+X5+X6,data=Skripsi,adapt
=adaptbisquare,coords=cbind(Skripsi$u,Skripsi$v),hatmatrix=TRUE,g
weight=gwr.bisquare)
gwr.adaptbisquare
```

```
## Call:
## gwr(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6, data = Skripsi,
##     coords = cbind(Skripsi$u, Skripsi$v), gweight =
gwr.bisquare,
##     adapt = adaptbisquare, hatmatrix = TRUE)
## Kernel function: gwr.bisquare
## Adaptive quantile: 0.9565478 (about 22 of 23 data points)
## Summary of GWR coefficient estimates at data points:
##                      Min.     1st Qu.      Median     3rd Qu.
Max.
## X.Intercept. -47.1780574 -38.2797948 -21.6002251  35.4342740
60.1846158
## X1            -0.9697924  -0.9530067  -0.8187882  -0.6188000
-0.3508655
## X2            -0.0336119  -0.0230029  -0.0144662   0.0011025
0.0103734
## X3             0.2590569   0.4977844   1.2771974   1.4929989
1.5776333
## X4            -0.0159413   0.2028010   0.3664227   0.3864554
0.3940710
```

```
## X5            -0.1833198  -0.1205295  -0.0874379  -0.0820263
-0.0666861
## X6             0.0118693   0.0120751   0.0125728   0.0136914
0.0146778
##                Global
## X.Intercept. 40.3941
## X1           -0.7405
## X2           -0.0492
## X3            0.6165
## X4            0.1912
## X5           -0.1172
## X6            0.0126
## Number of data points: 23
## Effective number of parameters (residual: 2traceS - traceS'S):
13.4344
## Effective degrees of freedom (residual: 2traceS - traceS'S):
9.5656
## Sigma (residual: 2traceS - traceS'S): 5.092551
## Effective number of parameters (model: traceS): 11.51318
## Effective degrees of freedom (model: traceS): 11.48682
## Sigma (model: traceS): 4.647202
## Sigma (ML): 3.284185
## AICc (GWR p. 61, eq 2.33; p. 96, eq. 4.21): 180.6449
## AIC (GWR p. 96, eq. 4.22): 131.4838
## Residual sum of squares: 248.075
## Quasi-global R2: 0.7684613
```

Lampiran 6.9 Estimasi Parameter Model GWR

Estimasi Parameter Model GWR Menggunakan Fungsi Pembobot *Fixed Kernel Gaussian*

```
gwr.fixgauss=gwr(Y~X1+X2+X3+X4+X5+X6,data=Skripsi,bandwidth
=fixgauss,coords=cbind(Skripsi$u,Skripsi$v),hatmatrix=TRUE,gweight
=gwr.Gauss)
gwr.fixgauss

## Call:
## gwr(formula = Y ~ X1 + X2 + X3 + X4 + X5 + X6, data = Skripsi,
##     coords = cbind(Skripsi$u, Skripsi$v), bandwidth = fixgauss,

##     gweight = gwr.Gauss, hatmatrix = TRUE)
## Kernel function: gwr.Gauss
## Fixed bandwidth: 1.271754
## Summary of GWR coefficient estimates at data points:
##                    Min.    1st Qu.     Median    3rd Qu.
```

```
Max.  Global
## X.Intercept. -38.675468 -24.984626  -0.258260  36.268774  61.45
1897 40.3941
## X1            -1.022855  -0.915640  -0.764602  -0.642173  -0.34
3772 -0.7405
## X2            -0.040370  -0.034900  -0.017969   0.005796   0.05
9221 -0.0492
## X3             0.137512   0.552886   0.983256   1.360096   1.57
0806  0.6165
## X4            -0.056337   0.195067   0.284700   0.363177   0.41
3882  0.1912
## X5            -0.200189  -0.118665  -0.093862  -0.085020  -0.08
0434 -0.1172
## X6             0.011845   0.011936   0.012397   0.013185   0.01
4817  0.0126
## Number of data points: 23
## Effective number of parameters (residual: 2traceS - traceS'S):
13.72814
## Effective degrees of freedom (residual: 2traceS - traceS'S): 9.
271856
## Sigma (residual: 2traceS - traceS'S): 4.890386
## Effective number of parameters (model: traceS): 11.6238
## Effective degrees of freedom (model: traceS): 11.3762
## Sigma (model: traceS): 4.414971
## Sigma (ML): 3.105007
## AICc (GWR p. 61, eq 2.33; p. 96, eq. 4.21): 179.3228
## AIC (GWR p. 96, eq. 4.22): 129.0137
## Residual sum of squares: 221.7446
## Quasi-global R2: 0.7930366
```

Lampiran 6.10 Uji Kesesuaian Model GWR

```
BFC02.gwr.test(gwr.fixgauss)

##
##  Brunsdon, Fotheringham & Charlton (2002, pp. 91-2) ANOVA
##
## data:  gwr.fixgauss
## F = 2.3491, df1 = 16.0000, df2 = 9.2719, p-value = 0.09463
## alternative hypothesis: greater
## sample estimates:
## SS OLS residuals SS GWR residuals
##         520.8960         221.7446
```

Lampiran 6.11 Uji Signifikansi Parameter Model GWR

T_hitung X1

```
t.beta1=gwr.fixgauss$SDF$X1/gwr.fixgauss$SDF$X1_se
t.beta1

##[1] -1.854822 -1.283470 -2.193834 -2.181742 -3.223144 -3.294213
-3.314448
##[8] -2.626359 -2.930249 -3.382303 -3.481241 -2.719011 -2.798725
-2.972538
##[15] -3.134035 -3.093028 -3.424640 -3.178161 -2.483793 -2.317232
 -3.148314
##[22] -3.490491 -1.552734
```

T_hitung X2

```
t.beta2=gwr.fixgauss$SDF$X2/gwr.fixgauss$SDF$X2_se
t.beta2

##[1] -0.41494740  0.52474935 -0.24150949 -0.12199683 -0.36856767
-0.33648142
##[7] -0.32543807  0.08557559  0.08832092 -0.02032408 -0.19807234
-0.45279230
##[13] -0.39320914 -0.38854979 -0.46706693 -0.14403812 -0.23279417
  0.03372576
##[19]  0.08737424  0.13459613 -0.40841879 -0.11508625  0.40939130
```

T_hitung X3

```
t.beta3=gwr.fixgauss$SDF$X3/gwr.fixgauss$SDF$X3_se
t.beta3

##  [1] 1.6285162 0.4262737 1.2196284 0.9179414 2.1902933 2.921599
0 3.4140751
##  [8] 3.2477154 3.3350077 3.2427110 2.8832262 2.1386706 1.854316
6 1.5195546
## [15] 3.0390203 3.4993937 2.9807108 3.3559507 3.1763880 3.068236
8 1.8006326
## [22] 3.0272772 0.4073608
```

T_hitung X4

```
t.beta4=gwr.fixgauss$SDF$X4/gwr.fixgauss$SDF$X4_se
t.beta4
```

```
## [1] 0.4840606 -0.3810192 0.8559677 0.7595673 2.2434224
2.4806124
## [7] 2.7656377 3.1215953 3.1509169 2.9938889 2.7002165
1.6661287
## [13] 1.7233082 1.8436899 2.3093273 3.0575193 2.6680547
3.1051204
## [19] 3.0934238 3.0721151 2.0839117 2.8303639 -0.1199627
```

T_hitung X5

```
t.beta5=gwr.fixgauss$SDF$X5/gwr.fixgauss$SDF$X5_se
t.beta5

## [1] -3.176730 -2.545356 -2.670742 -2.500259 -1.789017 -2.13428
7 -2.250091
## [8] -1.734520 -1.817193 -1.840494 -1.762312 -2.489767 -2.24044
9 -1.786072
## [15] -2.402921 -2.057226 -1.948793 -1.883246 -1.679522 -1.58464
1 -1.652486
## [22] -1.732404 -2.471443
```

T_hitung X6

```
t.beta6=gwr.fixgauss$SDF$X6/gwr.fixgauss$SDF$X6_se
t.beta6

## [1] 2.256890 2.114848 2.307622 2.294591 2.406908 2.471024 2.46
3548 2.194011
## [9] 2.349425 2.487687 2.463052 2.397017 2.387486 2.359988 2.46
1660 2.345693
## [17] 2.477827 2.440135 2.123978 2.053813 2.369263 2.473959 2.17
1324
```

Lampiran 6.12 Pembentukan Model GWR Setiap Lokasi

```
gwr.fixgauss$SDF$"(Intercept)"

## [1] 29.2041397 56.2895908 47.6873339 55.9206925 24.882346
0 1.5630708
## [7] -19.9822669 -38.1753653 -34.7044490 -20.3051030 -1.359897
7 27.4745771
## [13] 35.4280897 45.5475521 -0.2582603 -35.5544816 -3.406899
2 -29.6641491
## [19] -38.6754680 -38.3786525 37.1094574 -8.7607315 61.451897
1
```

gwr.fixgaussSDFX1

```
##  [1] -0.4502623 -0.3437722 -0.5298112 -0.5377536 -0.7645810
-0.7646019
##  [7] -0.8151569 -1.0037802 -0.9743947 -0.9115527 -0.8501883
-0.6279189
## [13] -0.6564281 -0.7235048 -0.7201314 -0.9197265 -0.8173105
-0.9386159
## [19] -1.0147635 -1.0228546 -0.7640347 -0.8883224 -0.4083355
```

gwr.fixgaussSDFX2

```
##  [1] -0.040369679  0.059221401 -0.022370569 -0.011671856
-0.034258087
##  [6] -0.029171014 -0.027712420  0.008868675  0.008500079
-0.001835365
## [11] -0.017969234 -0.039783806 -0.035542519 -0.037822589
-0.039727307
## [16] -0.012987808 -0.020542744  0.003091931  0.009435637
0.015286640
## [21] -0.039621453 -0.010490451  0.044403652
```

gwr.fixgaussSDFX3

```
##  [1] 0.5373884 0.1464673 0.3701642 0.2867077 0.7403757 0.982392
7 1.2465292
##  [8] 1.5575326 1.4975818 1.3012569 1.0639835 0.6380363 0.568382
6 0.5068660
## [15] 0.9832559 1.4786371 1.0640227 1.4189352 1.5708058 1.568950
2 0.6183949
## [22] 1.1663368 0.1375116
```

gwr.fixgaussSDFX4

```
##  [1]  0.05941384 -0.05633728  0.10344769  0.09420943  0.2645994
9  0.28470037
##  [7]  0.31874247  0.40259796  0.38931180  0.35659591  0.3207122
5  0.19052407
## [13]  0.19961060  0.22056720  0.26157517  0.36975898  0.3110741
1  0.37338852
## [19]  0.40773559  0.41388180  0.24966012  0.33875613 -0.0170227
8
```

gwr.fixgaussSDFX5

```
##  [1] -0.16612445 -0.20018897 -0.14500698 -0.14601526 -0.0906161
8 -0.09947969
##  [7] -0.10152098 -0.08486318 -0.08517669 -0.08365841 -0.0830116
```

```
5 -0.12283374
## [13] -0.11449701 -0.09877897 -0.11140158 -0.09386181 -0.0904784
4 -0.08597904
## [19] -0.08406054 -0.08183835 -0.08888108 -0.08043398 -0.1871097
8
```

gwr.fixgaussSDFX6

```
##  [1] 0.01188868 0.01465132 0.01326052 0.01380695 0.01306691
0.01239158
##  [7] 0.01195179 0.01191131 0.01187894 0.01213157 0.01252396
0.01271673
## [13] 0.01311055 0.01369161 0.01217985 0.01187966 0.01239733
0.01193762
## [19] 0.01193518 0.01184492 0.01344924 0.01240015 0.01481718
```