

# 3616-7493-1-SM

by dodu mulyadi

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## General metrics

**9,623**

characters

**1,385**

words

**110**

sentences

**5 min 32 sec**reading  
time**10 min 39 sec**speaking  
time

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## Score

**43**

## Writing Issues

**155**

Issues left

**121**

Critical

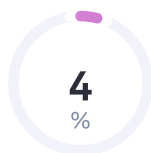
**34**Advanced

---

This text scores better than 43%  
of all texts checked by Grammarly

---

## Plagiarism

**4**

%

**3**


sources

4% of your text matches 3 sources on the web  
or in archives of academic publications

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## Writing Issues

<b>134</b>	<b>Correctness</b>	
15	Misspelled words	
1	Unknown words	
3	Mixed dialects of english	
19	Determiner use (a/an/the/this, etc.)	
2	Misplaced words or phrases	
6	Comma misuse within clauses	
61	Improper formatting	
1	Commonly confused words	
1	Misuse of quantifiers	
3	Incorrect noun number	
8	Punctuation in compound/complex sentences	
2	Incorrect verb forms	
1	Incomplete sentences	
1	Misuse of semicolons, quotation marks, etc.	
3	Wrong or missing prepositions	
2	Faulty subject-verb agreement	
4	Confused words	
1	Closing punctuation	
<b>7</b>	<b>Engagement</b>	
7	Word choice	
<b>14</b>	<b>Clarity</b>	
1	Intricate text	
12	Passive voice misuse	

**1** Wordy sentences 

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**Unique Words****24%**

Measures vocabulary diversity by calculating the percentage of words used only once in your document

unique words

---

**Rare Words****35%**

Measures depth of vocabulary by identifying words that are not among the 5,000 most common English words.

rare words

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**Word Length****4.5**

Measures average word length

characters per word

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**Sentence Length****12.6**

Measures average sentence length

words per sentence

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KERNEL NONPARAMETRIC REGRESSION FOR THE MODELIZING OF THE  
PRODUCTIVITY WETLAND PADDY

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Abstract

Nonparametric regression can be used<sup>2</sup> when the relationship between the response variable and the predictor variables have an unknown pattern form

the regression curve. One of the method<sup>3</sup> that can be used<sup>4</sup> to predict productivity<sup>5</sup> of the wetland paddy is a nonparametric regression kernel. In kernel regression, there are several types of estimator<sup>6</sup> that can be used<sup>7</sup> to<sup>8</sup> modelling<sup>9</sup> productivity of wetland paddy in Central Java, one of which is Nadaraya-Watson<sup>10</sup> estimator. Variables used in the study of the productivity<sup>11</sup> of rice as the response variable, while the predictor variables that harvested area, production<sup>12</sup> and rainfall<sup>13</sup>. Based on estimates<sup>13</sup> indicate that the kernel nonparametric regression optimum bandwidth value 1.2 and GCV = 1.7577. The coefficient of determination (R<sup>2</sup>) of 94.23% and MSE of 0.8560.

Keywords: Kernel Nonparametric Regression, Productivity, Wetland Paddy

## 1. Introduction

In regression analysis, there are two approaches, parametric approach<sup>14</sup> and nonparametric approach<sup>15,16</sup>. A parametric regression model requires an assumption that the form of the underlying regression function is known<sup>17</sup> except for the value<sup>18</sup> of a finite number of parameters. The selection of parametric<sup>19</sup> model depends very much on the problem at hand<sup>20</sup>. A serious<sup>21</sup> drawback of parametric modeling<sup>22</sup> is that a parametric model<sup>23</sup> may be too restrictive in some applications. If an in appropriate<sup>24</sup> parametric model is used<sup>25</sup>, it is possible to produce misleading conclusions from the regression analysis. In other situations, a parametric model may not be available to use. To overcome the difficulty caused by restrictive<sup>26</sup> assumption of a parametric from<sup>27</sup> of the regression function, one may remove the restriction that the regression

function belongs to a parametric family. This approach leads to so-called nonparametric regression [6].

There exist many nonparametric regression and smoothing method. One of methods used in this writing is by regression nonparametric approaching, because the approach does not depend on the assumption of a certain shape of the curve, thus providing greater flexibility [5]. The most popular methods include kernel, spline, local polynomial kernel, and deret fourier. One of regression nonparametric approaching used in this writing is Kernel. The strength of Kernel of regression nonparametric approaching is that it enables to solve easy and simple. In regression nonparametric kernel, there are several types of estimator that can

□

be used to modelling, one of which is Nadaraya- Watson estimator.

Researchs about regression nonparametric approaching of Kernel were done previously by [4] about Nadaraya-Watson estimator is method better of estimating model based on approaching which is not tied to the assumption in the form of certain regression curva, and research about bandwidth optimum with kernel regression semiparametrik approaching by [3].

Indonesia Ministry of Agriculture data indicates that from 19981, to 1985 and from 1998 to 1999, the conversion of paddy State of Indonesia is an agricultural country with one of the staple food in Indonesia is rice [1]. The majority of rice field conversion took place in Java, which had accounted for 60% of national rice production. Production of rice in the province of Central Java is the highest in Java. In Central Java according to the Central Bureau of Statistics paddy crop production is fluctuating [2].

<sup>73</sup> This results in the need for modeling to predict and know how change<sup>74 75,76</sup> productivity wetland paddy in Central Java. The result of the modeling is expected<sup>77</sup> to help the concerning parties the strategical steps is needed to be<sup>78</sup> done so that not suffering significant losses. Therefore, the appropriate statistical method for modeling productivity wetland paddy in Central Java is using the nonparametric regression approach of Kernel. The method of kernel nonparametric<sup>79</sup> regression is the regression method used when the curva<sup>80</sup> is between dependent and independent variable<sup>81</sup>, and Independent variable is not known for

the form<sup>82</sup> and pattern. The common<sup>83</sup> nonparametric regression model is as follows:

□ Flowchart 1. Analysis steps in this research

## 2. Method

□

= dependent variable

= independent variable

= regression function

$\hat{\beta}(1)$

$\hat{\beta}$

### 3.Results

#### 3.1 Determine Optimum Bandwidth

The first step before estimating the regression model is to determine the optimum bandwidth, namely bandwidth which<sup>84,85</sup> has a minimum value of GCV. The optimum bandwidth h value is a<sup>86</sup> positive integer.<sup>87 88</sup> The determination of the optimum<sup>89 90</sup>

#### 2.1 Data Resources

The main data resources<sup>91</sup> used in this research is the secondary data served by<sup>92</sup> the the Central Bureau of Statistics (BPS).<sup>93 94</sup> The data in this study is a secondary data, in the District / City in Central Java at 2015 were obtained from the Central Bureau of Statistics (BPS) with the response<sup>95</sup> variable is productivity wetland paddy.<sup>96 97</sup>

#### 2.2 Research Variable

Table 1. Research Variable

bandwidth h value is using GCV method then<sup>102</sup> running the program of the determination of optimal bandwidth (h) value on<sup>103</sup> productivity wetland paddy in Central Java based on GCV method.<sup>104 105</sup> The obtained result from the tested bandwidth (h) is as follows:<sup>106,107</sup>

Table 2. The Value Using GCV Method to Every Bandwidth



(h)

GCV

MSE

1,2

1,7577

0,8560

1,3

1,9525

0,9583

1,4

2,1860

1,0813

1,5

2,4583

1,2254

1,6

2,7651

1,3889

1,7

3,0992

1,5687

1,8

3,4530

1,7612

1,9

3,8191

1,9626

2

4,5630

2,3797

bandwidth (h)

Data

Variabel<sup>119</sup>

Variable

Information

Produktivität

Respon

Respon<sup>120</sup>

Harvested

area

Predictor

Nonparametrik<sup>121</sup>

Production

Prediktor

Nonparametrik

Rainfall

Prediktor

Nonparametrik

2.3 Procedures (or research design)

Analysis steps in this research can be described in diagram<sup>122</sup> as described in Flowchart 2.1 below:

Begin

Data

Determine the Optimal bandwidth with GCV method, After obtaining the optimal bandwidth then estimated the model with regression nonparametric approaching of kernel Nadaraya- Watson estimator<sup>123</sup>

Modelized the productivity wetland paddy in Central Java with Kernel regression nonparametric

End

□

Table 2 shows that the optimum bandwidth (h) on the average data of productivity wetland paddy in Central Java is on  $h=1.2$  because of the lowest GCV value. Then the optimum bandwidth is used to estimate the smoothing

function. MSE obtained amounted to 0.8560 viewed from the optimal bandwidth minimum of 1.2 GCV at 1.7577. Based on Table 2, it shows that for the optimum bandwidth = 1.2 has resulted  $R^2 = 94.23\%$  which is enough high.

### 3.2 The Modelizing of Productivity Wetland Paddy with Regression

#### Nonparametric Kernel

After knowing that the optimum bandwidth is

1.2, the next step is to determine the estimation model of productivity wetland paddy with regression nonparametric approaching of Kernel. The result of estimated model can be seen on equation 2. Equation 2 shows that the obtained model for productivity wetland paddy data in Cental Java as follows :

(2)

The plot of estimation results of productivity wetland paddy use an optimal bandwidth can be seen in Figure 1 as follows :

Figure 1. Plot Estimation Productivity Wetland Paddy Using Nonparametric Regression Kernel

#### 4. Discussion

Based on Figure 2, it can be seen<sup>143</sup> that raw data with estimation data have pattern is same. The estimation result of the lowest productivity wetland paddy<sup>144</sup> in Central Java<sup>145</sup> in Pekalongan. The estimation result of highest<sup>146</sup> productivity wetland paddy in Central Java in Klaten. The result of the model can be used<sup>147</sup> to forecast the average productivity wetland paddy that will be going to happen in the future by entering value<sup>148</sup> variable that can be predicted<sup>149</sup> in the equation<sup>150</sup> 2.

#### 5. Acknowledgement<sup>151</sup>

Thanks to Direktorat Riset dan Pengabdian Masyarakat Direktorat Jenderal Penguatan Riset dan Pengembangan Kementerian Riset, Teknologi, dan Pendidikan Tinggi Penelitian Dosen Pemula.

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5. Utami, T. W and Nur, I. M (2014). "Longitudinal Data Modeling Based On

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<sup>158</sup> 6. Wu, H. <sup>154</sup> and Zhang (2006). "Nonparametric

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1.	<del>inside</del> → inside	Misspelled Words	Correctness
2.	<i>be used</i>	Passive Voice Misuse	Clarity
3.	<del>method</del> → methods	Incorrect Noun Number	Correctness
4.	<i>be used</i>	Passive Voice Misuse	Clarity
5.	the productivity	Determiner Use (a/an/the/this, etc.)	Correctness
6.	<del>estimator</del> → estimators	Incorrect Noun Number	Correctness
7.	several types of estimator can	Wordy Sentences	Clarity
8.	<i>be used</i>	Passive Voice Misuse	Clarity
9.	<del>modelling</del> → modeling	Mixed Dialects of English	Correctness
10.	the Nadaraya-Watson	Determiner Use (a/an/the/this, etc.)	Correctness
11.	<del>productivity</del> → richness	Word Choice	Engagement
12.	, and	Punctuation in Compound/Complex Sentences	Correctness
13.	estimates,	Punctuation in Compound/Complex Sentences	Correctness
14.	parametric approach	Improper Formatting	Correctness
15.	<del>approach and</del> → approach and	Improper Formatting	Correctness
16.	, and	Comma Misuse within Clauses	Correctness
17.	<i>is known</i>	Passive Voice Misuse	Clarity
18.	<del>the value</del> → the value	Improper Formatting	Correctness
19.	the parametric	Determiner Use (a/an/the/this, etc.)	Correctness



20.	<del>the problem</del> → the problem	Improper Formatting	Correctness
21.	<del>at hand</del> → at hand	Improper Formatting	Correctness
22.	<del>serious</del> → severe	Word Choice	Engagement
23.	parametric modeling	Improper Formatting	Correctness
24.	<del>modeling is</del> → modeling is	Improper Formatting	Correctness
25.	<del>is that</del> → is that	Improper Formatting	Correctness
26.	<del>that a</del> → that a	Improper Formatting	Correctness
27.	parametric model	Improper Formatting	Correctness
28.	<del>in appropriate</del> → inappropriate	Confused Words	Correctness
29.	the appropriate	Determiner Use (a/an/the/this, etc.)	Correctness
30.	is used	Passive Voice Misuse	Clarity
31.	the restrictive	Determiner Use (a/an/the/this, etc.)	Correctness
32.	<del>from</del> → form	Confused Words	Correctness
33.	<del>There exist</del> → There exist	Improper Formatting	Correctness
34.	<del>exist many</del> → exist many	Improper Formatting	Correctness
35.	<del>many</del> → much	Misuse of Quantifiers	Correctness
36.	many nonparametric	Improper Formatting	Correctness
37.	nonparametric regression	Improper Formatting	Correctness
38.	<del>method</del> → methods	Incorrect Noun Number	Correctness
39.	the methods	Determiner Use (a/an/the/this,	Correctness

		etc.)	
40.	<del>nonparametic</del> → nonparametric	Misspelled Words	Correctness
41.	<del>approaching,</del>	Punctuation in Compound/Complex Sentences	Correctness
42.	<del>ertain</del> → particular, specific	Word Choice	Engagement
43.	<del>deret</del>	Unknown Words	Correctness
44.	<del>fourier</del> → Fourier	Misspelled Words	Correctness
45.	<del>the regression</del>	Determiner Use (a/an/the/this, etc.)	Correctness
46.	<del>the Kernel</del>	Determiner Use (a/an/the/this, etc.)	Correctness
47.	<del>nonparametric approaching</del>	Improper Formatting	Correctness
48.	<del>approaching is</del> → approaching is	Improper Formatting	Correctness
49.	<del>is that</del> → is that	Improper Formatting	Correctness
50.	<del>that it</del> → that it	Improper Formatting	Correctness
51.	<del>it enables</del> → it enables	Improper Formatting	Correctness
52.	<del>enables to</del> → enables to	Improper Formatting	Correctness
53.	<del>us to</del>	Incomplete Sentences	Correctness
54.	<del>simple</del> → straightforward	Word Choice	Engagement
55.	<del>modelling</del> → modeling	Mixed Dialects of English	Correctness
56.	<del>Researchs</del> → Research	Misspelled Words	Correctness
57.	<del>nonparametic</del> → nonparametric	Misspelled Words	Correctness
58.	<del>of</del>	Wrong or Missing Prepositions	Correctness

59.	<del>were</del> → was	Faulty Subject-Verb Agreement	Correctness
60.	the Nadaraya-Watson	Determiner Use (a/an/the/this, etc.)	Correctness
61.	a method	Determiner Use (a/an/the/this, etc.)	Correctness
62.	the model	Determiner Use (a/an/the/this, etc.)	Correctness
63.	, which	Punctuation in Compound/Complex Sentences	Correctness
64.	is not tied	Passive Voice Misuse	Clarity
65.	<del>curva</del> → curve	Misspelled Words	Correctness
66.	<del>curva,</del>	Punctuation in Compound/Complex Sentences	Correctness
67.	<del>semiparametrik</del> → semiparametric	Misspelled Words	Correctness
68.	<del>approaching</del> → contacting	Word Choice	Engagement
69.	19981,	Comma Misuse within Clauses	Correctness
70.	<del>the staple</del> → the staple	Improper Formatting	Correctness
71.	Java,	Comma Misuse within Clauses	Correctness
72.	Statistics,	Comma Misuse within Clauses	Correctness
73.	<i>This</i>	Intricate Text	Clarity
74.	<del>know how</del> → know-how	Misspelled Words	Correctness
75.	to change	Incorrect Verb Forms	Correctness
76.	to change	Incorrect Verb Forms	Correctness

77.	<i>is expected</i>	Passive Voice Misuse	Clarity
78.	<i>be done</i>	Passive Voice Misuse	Clarity
79.	nonparametric kernel	Misplaced Words or Phrases	Correctness
80.	<del>curva</del> → curve	Misspelled Words	Correctness
81.	variable,	Comma Misuse within Clauses	Correctness
82.	<del>the form</del> → The form	Improper Formatting	Correctness
83.	<del>common</del> → standard	Word Choice	Engagement
84.	bandwidth which	Improper Formatting	Correctness
85.	, which	Punctuation in Compound/Complex Sentences	Correctness
86.	<del>The optimum</del> → The optimum	Improper Formatting	Correctness
87.	optimum bandwidth	Improper Formatting	Correctness
88.	<del>bandwidth h</del> → bandwidth h	Improper Formatting	Correctness
89.	<del>value is</del> → value is	Improper Formatting	Correctness
90.	<del>is a</del> → is a	Improper Formatting	Correctness
91.	<del>main</del> → primary	Word Choice	Engagement
92.	<del>resources</del> → resources, sources	Misspelled Words	Correctness
93.	<del>is</del> → are	Faulty Subject-Verb Agreement	Correctness
94.	<del>is the</del> → is the	Improper Formatting	Correctness
95.	<del>the secondary</del> → the secondary	Improper Formatting	Correctness
96.	<del>data served</del> → data served	Improper Formatting	Correctness

97.	<del>served by</del> → served by	Improper Formatting	Correctness
98.	<del>by the</del> → by the	Improper Formatting	Correctness
99.	<del>the the</del> → the the	Improper Formatting	Correctness
100.	the <del>the</del> Central	Misspelled Words	Correctness
101.	<del>the response</del> → the response	Improper Formatting	Correctness
102.	<del>bandwidth h</del> → bandwidth h	Improper Formatting	Correctness
103.	<del>value is</del> → value is	Improper Formatting	Correctness
104.	<del>is using</del> → is using	Improper Formatting	Correctness
105.	the GCV	Determiner Use (a/an/the/this, etc.)	Correctness
106.	<del>method then</del> → method then	Improper Formatting	Correctness
107.	<del>then</del> → than	Commonly Confused Words	Correctness
108.	<del>running the</del> → running the	Improper Formatting	Correctness
109.	<del>the program</del> → the program	Improper Formatting	Correctness
110.	<del>program of</del> → program of	Improper Formatting	Correctness
111.	<del>of the</del> → of the	Improper Formatting	Correctness
112.	the determination	Improper Formatting	Correctness
113.	determination of	Improper Formatting	Correctness
114.	optimal bandwidth	Improper Formatting	Correctness
115.	<del>value on</del> → value on	Improper Formatting	Correctness
116.	on productivity	Improper Formatting	Correctness

117.	<del>Java based</del> → Java-based	Misspelled Words	Correctness
118.	the GCV	Determiner Use (a/an/the/this, etc.)	Correctness
119.	<del>Variabel</del> → Variable	Misspelled Words	Correctness
120.	<del>Respon</del> → Respond	Misspelled Words	Correctness
121.	<del>Nonparametrik</del> → Nonparametric	Misspelled Words	Correctness
122.	a diagram	Determiner Use (a/an/the/this, etc.)	Correctness
123.	estimator.	Closing Punctuation	Correctness
124.	<del>it shows</del> → it shows	Improper Formatting	Correctness
125.	<del>shows that</del> → shows that	Improper Formatting	Correctness
126.	<del>that for</del> → that for	Improper Formatting	Correctness
127.	<del>for the</del> → for the	Improper Formatting	Correctness
128.	<del>the optimum</del> → the optimum	Improper Formatting	Correctness
129.	resulted in	Wrong or Missing Prepositions	Correctness
130.	, which	Punctuation in Compound/Complex Sentences	Correctness
131.	<del>enough high</del> → high enough	Misplaced Words or Phrases	Correctness
132.	<del>model of</del> → model of	Improper Formatting	Correctness
133.	of productivity	Improper Formatting	Correctness
134.	productivity wetland	Improper Formatting	Correctness
135.	<del>wetland paddy</del> → wetland paddy	Improper Formatting	Correctness
136.	<del>paddy with</del> → paddy with	Improper Formatting	Correctness

137.	the regression	Determiner Use (a/an/the/this, etc.)	Correctness
138.	approaching → approach	Confused Words	Correctness
139.	the estimated	Determiner Use (a/an/the/this, etc.)	Correctness
140.	be seen	Passive Voice Misuse	Clarity
141.	en → in	Wrong or Missing Prepositions	Correctness
142.	Cental → Central	Confused Words	Correctness
143.	be seen	Passive Voice Misuse	Clarity
144.	paddy in → paddy in	Improper Formatting	Correctness
145.	Java in → Java in	Improper Formatting	Correctness
146.	the highest	Determiner Use (a/an/the/this, etc.)	Correctness
147.	be used	Passive Voice Misuse	Clarity
148.	the value, or a value	Determiner Use (a/an/the/this, etc.)	Correctness
149.	be predicted	Passive Voice Misuse	Clarity
150.	the equation	Determiner Use (a/an/the/this, etc.)	Correctness
151.	Acknowledgement → Acknowledgment	Mixed Dialects of English	Correctness
152.	Levelin → Level in	Improper Formatting	Correctness
153.	” → ,”	Misuse of Semicolons, Quotation Marks, etc.	Correctness
154.	, and	Comma Misuse within Clauses	Correctness

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155.	Analysis,	Punctuation in Compound/Complex Sentences	Correctness
156.	<i>A parametric regression model requires an assumption that the form of the underlying regression function</i>	For Review Only <a href="http://rdo.psu.ac.th/sjst/Ar-Press/2018May/12.pdf">http://rdo.psu.ac.th/sjst/Ar-Press/2018May/12.pdf</a>	Originality
157.	<i>of the regression function, one may remove the restriction that the regression function belongs to a parametric family. This approach leads to so-called nonparametric regression</i>	For Review Only <a href="http://rdo.psu.ac.th/sjst/Ar-Press/2018May/12.pdf">http://rdo.psu.ac.th/sjst/Ar-Press/2018May/12.pdf</a>	Originality
158.	<i>Zhang (2006). "Nonparametric Regression Methods for Longitudinal Data Analysis", John Wiley and Sons,</i>	Spaghetti plot - Wikipedia <a href="https://en.wikipedia.org/wiki/Spaghetti_plot">https://en.wikipedia.org/wiki/Spaghetti_plot</a>	Originality

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