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(Online)

ARPN Journal of Engineering and Applied Sciences

ISSN 1819-6608

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**ARPN Journal of Engineering and Applied Sciences**  
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August 2016 | Vol. 11 No.

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Fee](#)**Title:** Performance analysis of a vertical well with a finite-conductivity fracture in gas composite reservoirs**Author (s):** Yu Long Zhao, Freddy Humberto Escobar, Claudia Marcela Hernandez and Chao Ping Zhang

**Abstract:** It is well known that hydraulic fracturing can efficiently be applied to develop both low permeability and unconventional gas reservoir. Sometimes, the formations cannot be fully fractured and, then, the resulting fracture does not end up with infinite conductivity. Besides, for either tight or unconventional gas reservoir, a fracture network will be developed around the well during the fracturing process. This paper presents a semi-analytical model governing fluid flow in porous material for a finite-conductivity-fractured well in a composite gas reservoir, considering the fractures as either partially or fully penetrated. By nature, a fracture-network system around the well is always induced in tight gas formations, then, a composite model with inner dual-porosity to describe stimulated reservoir volume is established. Solutions for both constant-production rate and constant-bottom hole pressure are obtained by using the point-source function and the Laplace transformation techniques which are used along with the Stehfest algorithm to obtain the numerical inversion of the pressure and rate variables. The pressure-time and rate-time behaviors are then analyzed by careful observation to both transient-pressure and the rate-decline type curves. The models and type curves introduced in this work possess both theoretical and practical valuable application in the field of well test interpretation for the system under consideration.

[Full Text](#)**Title:** Intelligent parking by merging cloud and sensors**Author (s):** N. V. Rajeesh Kumar, R. Kamala Kannan and R. Madhan Kumar

**Abstract:** The aim of the project is to develop an Internet of Things (IOT). We propose Internet of Vehicles (IoV) by the combination of sensors and microcontrollers in the vehicles and cloud server to form an intelligent vehicle parking slot booking system. In this, Sensor will measure physical characteristics of the vehicle and converts them to digital signals and the microcontroller will handle the operations of electrical systems and processing. In the recent world, number of vehicles has been increased and so, the increasing amount of information requests thrown by vehicles cannot be managed by a traditional roadside unit (RSU) which is responsible to respond. Therefore, we introduced cloud which plays a major role in providing efficient services. We process the requests in our web applications hosted in the cloud.

[Full Text](#)**Title:** Study of change in the SCM's strength properties depending on the aqueous-clay suspension's concentration and muscovite's amount in its composition**Author (s):** Yuriev Pavel O., Lesiva Elena M., Bezrukikh Alexander I., Belyaev Sergey V., Gubanov Ivan Yu., Kirko Vladimir I. and Koptseva Natalia P.

**Abstract:** This article represents the results of the study of change in aqueous clay suspensions' (ACS) electrostatic properties depending on muscovite's concentration in their composition. The influence of ACS' concentration and muscovite's varied amounts in the composition of mechanically activated bentonite clay (Chernogorskoe field) used as a coupling agent in molding sand mixtures for steel and cast iron casting, on the mixture's strength properties has been studied. The increase in the sand-clay mixture's (SCM) strength properties and gas permeability depending on the ACS's and muscovite's concentration has been established.

[Full Text](#)**Title:** Prominent speed arithmetic unit architecture for proficient ALU**Author (s):** R. Rashvnee, D. Roshini Keerthana, T. Ravi and P. Umarani

**Abstract:** ALU is one of the most important unit of processor. The computing efficiency of the processor depends on the competency of the ALU. ALU unit performs the arithmetic and logical operations. The adder and multiplier are the main computational units of the arithmetic unit. The performance factors such as delay, power and area. Parallel prefix adders have better delay performance; it involves the execution of the operation in parallel. Brent Kung adder is the most area and power efficient parallel prefix adder. In this paper we proposed high speed Brent Kung adder which consists of Urdhava Tiryakbhyam sutra based Vedic multiplier. In the conventional multiplier speed is restricted by the adders used for partial products. The proposed multiplier is used in the arithmetic unit of an ALU shows better performance in terms of delay. The proposed arithmetic architecture is designed, evaluated and implemented in Xilinx FPGA.

[Full Text](#)

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**Title:** Study of distance-based Outlier Detection

**Author (s):** Pritam Pramanik, Rahul Singh and Sathyabama R.

**Abstract:** The classic k-NN technique is widely used for observing density of each outlier which will be able to notify the detected ways i.e., fast reverse nearest Neighbors search regarding each outlier which include high dimensions, hubness, antihubs, outliers and unattended outlier. The distinction between unsupervised and supervised outlier detection can apprise solely the closest Fast Nearest Neighbors Search with variety of nodes between them on the opposite hand unsupervised Detection filter Fast Nearest Neighbors Search relating to distance and can detect and list out every of the closest neighbors. Our technique supplies proof that demonstrating that distance-based ways in which can prove further contrastive scores in Big-dimensional settings. The property has a definite impact, by examining the fast distance resulting outliers. Artificial and in real- world knowledge sets, offers better sets of objective which may list out Fast Nearest Neighbors Search based on Unsupervised based Outlier Detection.

[Full Text](#)

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**Title:** Circular monopole slotted antenna with FSS for high gain applications

**Author (s):** B. T. P. Madhav, A. V. Chaitanya, R. Jayaprada and M. Pavani

**Abstract:** A coplanar waveguide feed wideband antennas are designed with slots on the radiating element and stubs on ground plane. Proposed model 1 exhibiting notch band characteristics at desired frequencies (3.5-4.5 GHz, 7.5-8 GHz) and model 2 is designed to operate in the ultra-wide band region. To enhance the gain characteristics of the proposed models incorporated a mushroom structured like frequency selective surface as reflecting device beneath the antenna structure. By placing FSS structure a stable gain of 7dB is attained from model 1 and 5dB in model 2. The experimental results of the proposed wide band antenna of model 1 are in good correlation with the simulated results from HFSS.

[Full Text](#)

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**Title:** Model validation for temperature profile inside FFB during sterilization for palm oil mill process

**Author (s):** Arif bin Ab Hadi, Dato Ir. Abd. Wahab Mohammad and Ir. Mohd Sobri Takriff

**Abstract:** The purpose of a developing a reliable and accurate spreadsheet modeling tools was in order to investigate heat transfer efficiency inside mill sterilizer cage by predicting the temperature profile inside FFB at various locations inside the cage. The model was previously validated based on Mongana Report, Chan SY and Ang et al suggested that the model was best predicted by the experimental data which was taken from experimentally determined data of Ang et al, based on 15kg bunch at sterilization time of 1 hour (3600s) with the thermocouple inserted into a hole drilled near or beside stalk. In this study, an experiment was conducted to investigate the temperature profile inside FFB based on different FFB weights (12kg, 15kg and 18kg) by using temperature sensor probe inserted into a drilled hole beside FFB stalk and inside the stalk. The result suggest that temperature profile located at near or beside the stalk was best represented as the temperature profile located at the center of FFB as per validated result with Ang et al, with the smallest percentage error in the range of 0.31-5.82% for all FFB weight (12kg, 15kg and 18kg).

[Full Text](#)

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**Title:** Content image detail enhancement on wavelet analysis using satellite and medical images

**Author (s):** Kalyan Babu Ch., Karthick C. and Satish Kumar V. H. N. S.

**Abstract:** To Improve Image Quality on Contrast and Sharpness using Wavelet based smoothness and gradient operator on Image Enhancement. Detail enhancement is required by lot of problems in the fields of computational photography and image processing. In Existing Method on Smoothing and gradient operator algorithm reduce color deformation in the detail-improved image, especially around pointed edges. In our proposed method we implement on Wavelet using with smoothness for contrast enhancement and gradient operator on color image sharpness enhancement. Then visibility refurbishment component utilize average color difference standards and enhanced sharpen and contrast on image with improved feature. Finally the simulated result shows that enhanced detail image.

[Full Text](#)

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**Title:** Validation of the Grader's ability using measurement system analysis

**Author (s):** Ivan Gunawan and Dwi Agustin Nuriani Sirodj

**Abstract:** Quality control is one of the important thing for the company in maintaining consistency of product quality. Time always becomes a technical problem that often occur in quality control process while we are measuring quality characteristics with specific device. So, it can make the analysis and decision be late because it is not in accordance with the operational needs. Upgrading or adding a number of specific devices is not a wise solution because the impact is significant increase in the cost of quality. More efficient way for the company to reduce the quality cost is to develop human resource with particular sensory sensitivity to be a Grader. On the one hand the using of human labor as Grader is a practical solution in order to reduce the cost of quality, but on the other hand would cause a problem of trust between suppliers and companies (as customers). Grader often considered subjectively in providing an assessment of the characteristics of quality for the materials supplied by the supplier. Some methods in MSA as Gage R&R and Gage Linearity and Bias Study will be applied to validate Grader's ability in assessing the quality characteristics. The results of the study showed that the gage R&R not only can validate the Grader's ability but also detect when needed improvement for the measurement system in assessing the quality characteristics.

[Full Text](#)

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**Title:** Speed control of induction motor without speed sensor at low speed operations

**Author (s):** Akshay Prasad Dubey and Saravana Kumar R.

**Abstract:** This paper represents the control strategy for the speed control of induction motor without using any feedback position sensor. The system uses speed, torque and current loops to estimate the actual speed of the motor and to generate the six pulses according to the error signal between the reference speed and the estimated speed. Six pulses are given to the real time inverter which is supplying AC source to the motor. The change in characteristics of the pulses changes the speed of the induction motor. The hardware setup is made by interfacing between the MATLAB simulink model and the field sensors and the inverter. The proposed system is simulated in the MATLAB/ Simulink, also the system is dumped into the dSpace System and Arduino Board to generate the required six pulses for the six bridge inverter. These pulses are given to the inverter. Thus, the speed of the system is controlled without using the position sensor. This system is mainly proposed to reduce the cost of the system by eliminating the use of position feedback sensor by the current and voltage sensors. This system is having high accuracy, less cost, less complexity and weight of the system and it is highly reliable and efficient system.

[Full Text](#)

**Title:** Digital branding: An empirical study with special reference to E-commerce startups

**Author (s):** Brijesh Sivathanu

**Abstract:** Advent of new technology, media and tools are rapidly reshaping the traditional ways of branding. Branding is the challenge for any of the e-commerce startups. This paper aims to highlight the digital branding practices of e-commerce startups and study its impact on the consumer buying behavior. A primary survey was conducted in Pune city using a structured questionnaire among 380 consumers who have purchased online. The exploratory factor analysis technique was deployed to identify the antecedents contributing to the digital branding of the e-commerce startups. Multiple Linear regression technique was used to understand the impact of the digital branding practices of the e-commerce startups on the consumer buying behavior. The results and findings clearly show that there exists a significant impact of the digital branding practices on the consumer buying behavior. This study attempts to interweave the disciplines of digital branding and consumer buying behavior, a crucial activity for the survival of e-commerce startups, given their lack of resources, financial cost constraints and the fundamental need to find and maintain clients. The significant contribution of this paper is that it provides a basis for conceptualizing a model of digital branding practices for the e-commerce startup firms performing under dynamic and competitive global environments.

[Full Text](#)

**Title:** Novel approach of Data Reconciliation in cement mill for kernel PCR algorithm

**Author (s):** B. Dinesh Kumar, M. Guruprasath and Komanapalli Venkata Lakshmi Narayana

**Abstract:** The quality of finished product of a cement mill is measured in terms of blaine, which is the measure of specific area of cement. Normally blaine is measured offline and maintaining the blaine is very important because it directly hampers the cement strength and also affects production cost. A soft sensor based kernel autoregressive exogenous model (ARX) was developed to predict the blaine quality for a defined sampling period to be used in a controller. ARX model includes the past blaine predictions as regressors in addition to the other informative variables in order to predict the blaine. The quality of predictions is largely dependent on data; the construction of data to be used in the algorithm requires good process understanding as the raw data collected from the process will have many information that can mislead the prediction. This means the information may cause over fitting or sometimes reverse modeling because of excess information. In this paper, an automatic method to align data based on the process characteristics to be fed into the algorithm for improving the prediction based on data reconciliation method is proposed. Data Reconciliation (DR) is a technology that uses process information (input data's) and mathematical model to automatically align the variables according to the dynamics of the industrial processes.

[Full Text](#)

**Title:** Optimization of spatial data sample for gold mineral prediction

**Author (s):** Nur Ali Amri, Abdul Aziz Jemain and Ahmad Fudholi

**Abstract:** This study examines the relationship between the results of semivariogram fitting conformity with estimating based on errors produced. The experimental semivariogram estimation was calculated using robust methods, while the theoretical semivariogram function used are spherical and exponential models, with weighted least squares and ordinary least squares approaches. Consistently, the four semivariogram fittings produce root mean square error (RMSE) fluctuates, while the values are proportionally to the median absolute deviation (MAD) generated by ordinary kriging.

[Full Text](#)

**Title:** Calculated characteristics of a prototype model of beam recirculation in a linear accelerator with standing wave

**Author (s):** Aleksandr Evgenevich Novozhilov, Aleksandr Nikolaevich Filatov and Vladimir Kuzmich Shilov

**Abstract:** In this paper we discuss the justification of a beam recirculation scheme in a prototype model of an accelerator with standing wave, the justification of a calculation method for bending magnets and the choice of their geometry, the calculation of the radial and longitudinal dynamics of particles in a system with beam recirculation, and the influence of various parameters of the scheme on the beam characteristics. In selecting the beam recirculation scheme, the fact is determinative that, in the operation of the linear electron accelerator in the standing wave mode, it becomes possible to perform an acceleration of the beam in the opposite direction in the same structure, which does not lead to a significant increase in the size of the entire setup. It is also reasonable to stay with the double passing of the beam along the biperiodic retarding structure, which greatly simplifies the technological implementation of the recirculation process scheme.

[Full Text](#)

**Title:** BLDC torque ripple minimization using modified Staircase PWM

**Author (s):** M. Senthil Raja and B. Geethalakshmi

**Abstract:** This paper presents a BLDC motor drive system using modified Staircase PWM (SCPWM). Based on the hall position sensor signal, the controller generates Staircase PWM to drive the BLDC motor. Because it's SCPWM instead of Sine PWM signal, minimize pulsation torque ripple is more efficiently at various speeds. The BLDC motor has the advantage of being a special electrical machine and high power applications a staircase modulation, also known as selective harmonic elimination based method, has been proposed. This method is used to reduce the switching losses to a minimum value and to improve the efficiency of the inverter. Finally, the simulation and experimental results are presented to minimize pulsation





## OPTIMIZATION OF SPATIAL DATA SAMPLE FOR GOLD MINERAL PREDICTION

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### ABSTRACT

This study examines the relationship between the results of semivariogram fitting conformity with estimating based on errors produced. The experimental semivariogram estimation was calculated using robust methods, while the theoretical semivariogram function used are spherical and exponential models, with weighted least squares and ordinary least squares approaches. Consistently, the four semivariogram fittings produce root mean square error (RMSE) fluctuates, while the values are proportionally to the median absolute deviation (MAD) generated by ordinary kriging.

**Keywords:** robust semivariogram, WLS and OLS, ordinary kriging

### 1. INTRODUCTION

Minerals of mining industry, especially gold mineral, is a business that almost could carries a high risk potentially. The exploration is a part of crucial stage done before starting the exploitation of minerals activity. Failure in exploration, particularly in the amount of reserve prediction, of course, affect the bankruptcy for the company. Therefore, the accuracy and precision in this activity should be desired. The accuracy in gold mineral calculation starts from sampling study. While precision in methods using and calculations become one of the main base.

This study presents three case are, the semivariogram estimated, kriging prediction and optimization of sample used for reserves calculation. Estimation is a tool to get parameters as a base of kriging prediction. These parameters can be obtained from fitting experimental semivariogram with theoretical semivariogram function which in this study, using robust methods. The precision of semivariogram fitting measured by the root mean square error (RMSE) produced, while accuracy for the prediction kriging measured by the median absolute deviation (MAD). The information about optimal data sample used can be seen from the several experiments kriging predictions, i.e. kriging prediction based on errors of original and reduction data. Data reduction is based on 10, 20, 30 and 40 percent losing of original data. In this case, the points of data left used as a predictor for the whole of eliminated data. The changes of deviation value structure that measured by MAD is used to estimate the changes in the behaviour of data.

### 2. MATERIAL AND METHOD

This study is about kriging prediction of gold resource distributed in the veins. The vein as a sheet-shaped space in the ground where minerals can precipitate. Gold mineral distribution is highly depend on the vein

characteristic (Kerrod, 1984). Several major vein characteristics that can be used as reference. Some of the basic characteristics are, mineral or metal components therein are not uniformly distributed in the ore body. Some veins have a dimension that is not too wide, and it's vulnerable to the occurrence of dilution for primary mineral. One thing that also needs to be considered is the possibility of highly gold grade differences and unpredictable, between one host to another, even though it is in a system of veins (Barnes, 1988, Annels, 1991).

Base on this study, geostatistics is a method works based on grade-sample. A number of 128-core drilling samples was obtained from the drilling points in Ciurug veins, area situated in the mountains-Pongkor, Indonesia. Concession of a gold mining company PT. Aneka Tambang UBPE Pongkor located in the area which an altitude of  $\pm 850$  m above sea level. With the aim to reduce the environmental damage, underground mining is used in this mining operations.

While semivariogram as a part of geostatistics tool is a mathematical function which is used to recognize the behaviour of gold mineral distribution. Because of data limited, this function as generally then presented as discrete functions. To determine the pattern of continuous validity approaches, fitting to the theoretical functions would be executed. The experimental semivariogram used here, based on robust model (Cressie and Hawkins, 1980). The weighted least squares (WLS) and ordinary least squares (OLS) used as an approach to the fitting of semivariogram function. Two semivariogram function theory of spherical and exponential formula used. The parameters of fitting primarily, sill, nugget and range which is then used as the basis for calculations in kriging prediction.

The robust experimental semivariogram was calculated using the following equation (Cressie, 1993):



$$\bar{\gamma}(\mathbf{h}) = \left( \frac{1}{2|N(\mathbf{h})|} \sum_{i=1}^{N(\mathbf{h})} [Z(\mathbf{s}_i) - Z(\mathbf{s}_j)]^2 \right)^{1/2} / \left( 0.457 + \frac{0.494}{|N(\mathbf{h})|} \right)$$

OLS and WLS model approaches is used, while the spherical and exponential model of semivariogram can be

expressed by the following equation in Table-1 and Table-2 (Cressie and Hawkins, 1980, Moustafa, 2000):

**Table-1.** Least squares models for semivariogram fitting.

	Approach
OLS	minimum $\sum_{j=1}^J [\hat{\gamma}(\mathbf{h}_j) - \gamma(\mathbf{h}_j; \theta)]^2$
WLS	minimum $\sum_{j=1}^J \left( \frac{\hat{\gamma}(\mathbf{h}_j)}{\gamma(\mathbf{h}_j; \theta)} - 1 \right)^2 N(\mathbf{h}_j)$

**Table-2.** Semivariogram theory of model based.

	Semivariogram theoretical, $\gamma(\mathbf{h})$	
Spherical	0,	$\mathbf{h}=0$
	$C_0 + C_1 \left[ \frac{3}{2} \left( \frac{ \mathbf{h} }{a} \right) - \frac{1}{2} \left( \frac{ \mathbf{h} }{a} \right)^3 \right]$ ,	$0 < \mathbf{h} \leq a$
	$C_0 + C_1$ ,	$ \mathbf{h}  > 0$
Exponential	$\left\{ \begin{array}{l} 0, \\ C_0 + C \left[ 1 - \exp \left( -\frac{ \mathbf{h} }{a} \right) \right] \end{array} \right.$	$\mathbf{h}=0$ $\mathbf{h} \neq 0$

Some kriging methods are used in various studies, but ordinary kriging (OK) is a technique used in this study. OK is a linear extrapolation technique introduced by Matheron (1963). The technique which is assumed based on the stationary principle is believed quite well, because in addition it's consider to the weighted values between points, and also produced the variance prediction which is quite reliable.

Generally, OK prediction system (Van Groenigen, 2000, Giraldo, 2011) which referring to Matheron's equation, as the optimization of objective function value,  $\hat{Z}(\mathbf{s}_0)$  with  $n$  observations. It is expressed as:

$$\hat{Z}(\mathbf{s}_0) = \sum_{i=1}^n w_i Z(\mathbf{s}_i).$$

where  $w_i$  is the weight of  $i$  observation. Kriging variance can be written as:

$$\sigma_{OK}^2(\mathbf{s}_0) = E[Z(\mathbf{s}_0) - \hat{Z}(\mathbf{s}_0)]^2.$$

### 3. RESULT AND DISCUSSIONS

Before estimating the semivariogram and kriging prediction, the structural analysis needs to be calculated. Structural analysis may use of coefficient of variation

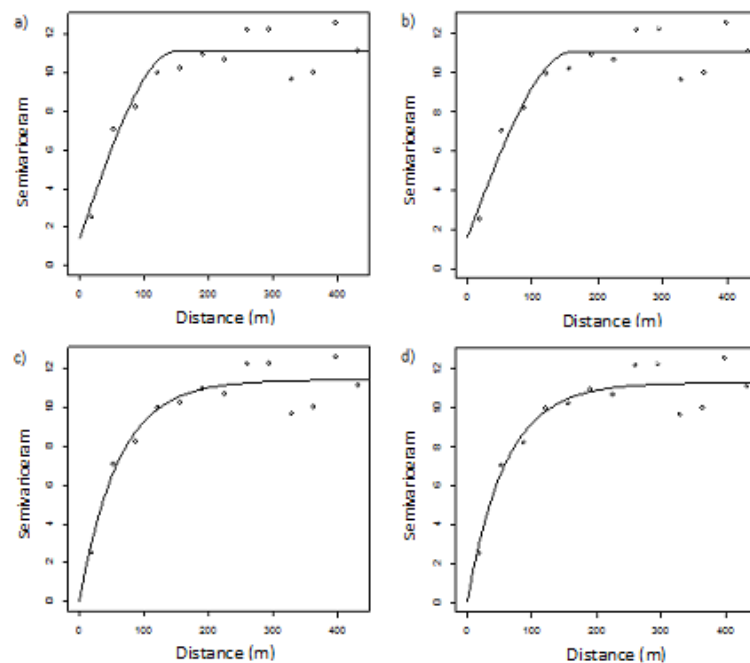
(CV) or skewness. Fytas *et al.* (1990) and Journal (1983) reported that semivariogram can work well and produces of a good linear kriging prediction if the coefficient of variation of data is less than one ( $CV < 1$ ). While Dominy *et al.* (1997) and Roy *et al.* (2004) provides more lenient restrictions, namely that ordinary kriging could work well if CV is less than 1.5. As for skewness equal to 0.5 or less, its advised enough using the polygon or inverse distance weighted method. But if the skewness is more than 0.6, preferably is using of kriging method. In this study, statistical values of the coefficient of variation is 0.629. The skewness value here is, 0.882. Therefore, the next process is semivariogram estimations.

Table-3 presents the result of experimental semivariogram estimation refer to the robust method. Distance here means as a distance of each points semivariogram estimation, and  $np$  is the amount of pairs points. Terms of semivariogram calculation is that, the number of pairs point data should be in excess of 30 (Journal and Huijbregts, 1978). In this calculation as shown in Table-3, the minimum number of pairs point data is, 68. Semivariogram fitting for the four models are as in Figure-1. Model-1 and Model-2 are the fitting models which are based on spherical functions, each based on the WLS and OLS models. As for the Model-3 and Model-4 are the fitting based on exponential functions which also based on WLS and OLS models.



**Table-3.** Robust experimental semivariogram estimation.

Distance, h	$np$	$\bar{\gamma}(h)$
17.298	68	2.529
51.894	289	7.085
86.490	385	8.203
121.086	417	10.012
155.683	451	10.227
190.279	491	10.970
224.876	437	10.722
259.472	417	12.233
294.068	358	12.264
328.664	375	9.654
363.260	347	10.037
397.857	343	12.581
432.453	318	11.147

**Figure-1.** Graff of semivariogram fitting: (a) Model-1, (b) Model-2, (c) Model-3 dan(d) Model-4.

In this calculation, the kriging prediction based on  $150 \times 41$  grid points, where the distance of each points data is 10. The grid determination is based on the outermost points position. Table-4 presents the RMSE semivariogram fitting exposure. Column 3 is the median absolute deviation (MAD) values for point kriging prediction based on original data. While columns 4 to 7

are the MAD values for data losing (in percent of original data). It appears that consistency ranking between RMSE and MAD happens to the kriging prediction of original data. While in data losing, consistency only happen in Model 3 and Model-4. This applies to the consistency of the data losing 10 percent only.

**Table-4.** Errors of fitting semivariogram (in RMSE) and point kriging (in MAD) based on data and losing.

Model	Semi- variogram RMSE	MAD of point kriging based on				
		Original data	Losing data (%)			
			10	20	30	40
Model-1	0.830	1.638	1.397	1.397	2.625	2.341
Model-2	0.865	1.683	1.434	1.378	2.638	2.163
Model-3	0.702	1.549	1.410	1.308	2.203	2.891
Model-4	0.683	1.539	1.409	1.299	2.195	2.867

#### 4. CONCLUSIONS

Given the results from this study, the following remarks may be concluded:

- RMSE value based on semivariogram fitting parameters of exponential model (Model 3 and Model 4), are generally smaller than the spherical model calculations.
- The changes between RMSE fitting semivariogram value and MAD prediction kriging point applies consistently only to the prediction based on original data.
- The consistency of the RMSE and MAD values in data losing occur only in the point kriging prediction of 10 percent data losing.

#### ACKNOWLEDGEMENTS

The authors would like to thank the PT. Aneka Tambang UBPE Pongkor, UPN "Veteran" Yogyakarta and the Solar Energy Research Institute (SERI), UKM which have provided data support and funding (GGPM-2014-029) of this study.

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