MDMAE 2014

2014 International Conference on Mechanical Design, Manufacture and Automation Engineering

January 11–12, 2014, Phuket, Thailand

Abstract

DEStech Publications, Inc.

2014 International Conference on Artificial Intelligence and Software Engineering(AISE2014)

2014 International Conference on Mechanical Design, Manufacture and Automation Engineering (MDMAE2014)

2014 International Conference on Global Economy, Commerce and Service Science(GECSS2014)

2014 International Conference on Education Reform and Modern Management (ERMM2014)

January 11-12, 2014, Phuket, Thailand

Conference Program Guide

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Morning, January 12, 2014(Sunday)		
09:00-09:15	Open Ceremony	Tamarind Bay room Cape Panwa Hotel
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10:00-10:15	Coffee Break	
10:15-11:00	Keynote Speech 2 *Prof. Chih-Min Lin*	
11:00-12:30	Oral Session 1 *AISE2014*	
12:00-14:00	Buffet Lunch	Café Andaman Cape Panwa Hotel
Afternoon, January 12, 2014 (Monday)		
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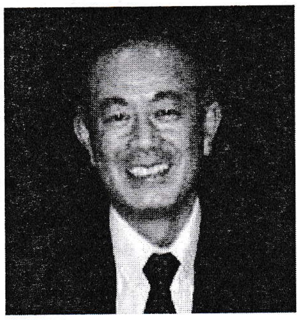
15:00-15:15	Coffee Break	

PART 2: KEYNOTE SPEECHES

Keynote Speech 1: Systemic Risks and Resilience of Global Financial Networks



Speaker: Prof. Akira Namatame, University of Haute-Alsace, France
Time: 09:15-10:00, January 12, 2014
Location: Tamarind Bay room, Cape Panwa Hotel

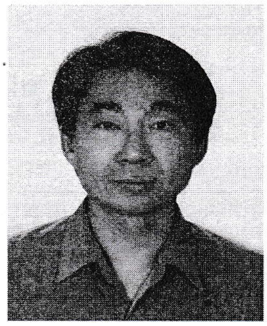
Biography: Dr. Akira Namatame (www.nda.ac.jp/~nama) is Professor of Computer Science Department at National Defense Academy of Japan. He is well-known as an international research leader in the field of multi-agent modeling and socio-economic complexity. In the past ten years he has given over 30 invited talks, and over 10 tutorial lectures. He has also been a leading figure in the community of researchers working on socio-economic complexity, for instance as program leader in many international conferences in the fields. His research interests include multi-agent systems, complex networks, financial networks, evolutionary computation, and game theory. He is the editor-in-chief of Springer's Journal of Economic Interaction and Coordination. He has published more than 250 refereed scientific papers, together with eight books on multi-agent systems, collective systems and game theory.

Abstract: The recent financial crises have made it clear that increasingly complex strategies for managing risk in individual financial institutions have not been matched by corresponding attention to overall systemic risks. The qualification of systemic risks lies in the systemic nature and risks to one system may present an opportunity to another system. The impacts of systemic risks challenge for secure the financial systems as well as many socio-economic systems. However the consequences of systemic risks are harder to predict and estimate and understanding the nature of systemic risks presents challenges to all of us.

In this talk I survey a number of interesting theoretical and empirical studies on systemic risks and introduces some fundamental analytical and simulation models on systemic risks. These models consider the interplay between the characteristics of individual institutions and the overall dynamics of the financial networks. These models basically focus on designing of regulation policies aimed at reducing systemic risk.

The network is only as strong as its weakest link, and trade-offs are most often connected to a function that models system performance management. In this talk I also introduce the issue of enhancing resilience of global financial networks.

Keynote Speech 2: Development of Fuzzy Neural Network and Fuzzy Cerebellar Model Articulation Controller for Control Problems



Speaker: Prof. Chih-Min Lin, Chair Professor and Dean of Electrical and Communication Engineering College, Yuan Ze University, Taiwan
Time: 10:15-11:00, January 12, 2014
Location: Tamarind Bay room, Cape Panwa Hotel

Biography: Prof. Chih-Min Lin is currently a Chair Professor and Dean of Electrical and Communication Engineering College, Yuan Ze University, Taiwan. He also serves as an Associate Editor of IEEE Trans. on Cybernetics; Asian Journal of Control; International Journal of Fuzzy Systems; Intelligent Automation and Soft Computing; and International Journal of Machine Learning and Cybernetics. He has been the Chair of IEEE Computational Intelligence Society Taipei Chapter, the Chair of IEEE Systems, Man, and Cybernetics Society Taipei Chapter, a Board of Governor of IEEE Taipei Session. He has been awarded as the Distinguished Research Professor from National Science Council in Taiwan, the Distinguished Engineering Professor from China Engineering Society in Taiwan, and the Distinguished Electrical Engineering Professor from Chinese Electrical Engineering Society in Taiwan. He has been invited to give 9 keynote speeches in the international conferences. He is now a Board of Governor of IEEE Systems, Man, and Cybernetics Society. His research interests include fuzzy systems, neural network, cerebellar model neural network, and intelligent control systems. He is an IEEE Fellow and IET Fellow. Till now he has published 147 journal papers and 158 conference papers.

Abstract: The neural-network based control technique has represented an attractive design method for control of dynamic systems. The most useful property of neural network is the ability to approximate linear or nonlinear mapping through learning. Based on this property, the neural-network-based controllers have been developed to compensate the effects of nonlinearities and system uncertainties, so that the stability, convergence and robustness of the control system can be improved. Recently, the recurrent fuzzy neural networks have been extensively presented. With the delayed feedback paths introducing dynamics to the model, the RFNN can be regarded as dynamic systems; they can learn and memorize the information of the system dynamics implicitly without assuming much knowledge about the structure of the system under consideration. The RFNN is a dynamic mapping network and is more suitable for describing dynamic systems. Moreover, based on biological prototype of human brain and improved understanding of the functionality of the neurons and the pattern of their interconnections in the brain, a theoretical model used to explain the information-processing characteristics of the cerebellum was developed independently by Marr (1969) and Albus (1971). Cerebellar model articulation controller (CMAC) was first proposed by Albus in 1974. CMAC is a learning structure that imitates the organization and functionality of the cerebellum of the human brain. That model revealed the structure and functionality of the various cells and fibers in the cerebellum. The core of CMAC is an associative memory which has the ability to approach complex nonlinear functions. CMAC takes advantage of the input-redundancy by using distributed storage and can learn nonlinear functions extremely quickly due to the on-line adjustment of its system parameters. CMAC is classified as a non-fully connected perceptron-like associative memory network with overlapping receptive-fields. It has good generalization capability and fast learning property and is suitable for a lot of applications. This talk will introduce several NN-based and CMAC-based adaptive learning systems; these systems combine the advantages of NN and CMAC adaptive learning ability, fuzzy inference property and control technique. In these systems, the on-line parameter training methodologies, using the gradient descent method and the Lyapunov stability theorem, are proposed to increase the learning capability. Moreover, the applications of these systems in nonlinear control systems; a motor-toggle servomechanism, an anti-braking system, a wing rock motion control system, a two-axis linear piezoelectric ceramic motor, a magnetic ball levitation system and a biped robot control system, are demonstrated.

PART 3: ORAL SESSIONS

Oral Session 1: AISE2014

Time: 11:00-12:30, January 12, 2014 **Location: Location: Tamarind Bay room, Cape Panwa Hotel**

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Soodeh Nikan and Majid Ahmadi AISE-A102

Symmetric Alpha Stable Distribution Model Application in Detecting Double JPEG Compression
Ru ZHANG, Xiao-gang YU, Jing ZHAO and Jian-yi LIU AISE-A019

Incorporate the Influence of Passenger Flow in Train Regulation of Urban Rail
Yao CHEN, Chu-chu MAO, Hai-nan ZHU and Hai-rong DONG AISE-A027

Research on Nonnegative Tucker3 Decomposition in Krylov Sub-Space Calculation for Feature Extraction
Hai-jun WANG, Jia-xin MA and Fei-yun XU AISE-A035

Basic Principles and Summative Assessment of New Horizon College English Network Teaching Software
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Language Structure Study Using Slot Alignment
Gend Lal PRAJAPATI and Kavita CHOUDHARY AISE-A046

Performing Bayesian Inference Using Apache Hadoop MapReduce
Nipat Jongsawata and Wichian Premchaiswadi AISE-A058

Mobile Phone APP Software Browsing Behavior using Clustering Analysis
Chui-yu CHIU, Ju-min LIAO, I-ting KUO and Po-chou SHIH AISE-A062

A Novel Image Watermarking Scheme Using Firefly Algorithm
Charu Agarwal, Anurag Mishra, Arpita Sharma and Girija Chetty AISE- A077

The Implementing of an Ontology-based Medical Decision Support System on Breast Cancer
Shu-hsien LIAO, Shu-li KAN and Shao-ling LU AISE-A082

Oral Session 2: AISE2014&MDMAE2014

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Oral Presentation

Modelling and Anazlyzing Parallel Applications in Highly Distributed Systems
Alberto Núñez, Manuel Núñez, Mercedes G. Merayo and Sergio Núñez AISE-A083

Web-based Training for Computer Science: Limitations and Recommendations
Hamid Yasinian AISE-A093

Study of Intelligent Impedance Control for Robot Arm
Yoshishige Sato AISE-A139

Spatio-Temporal Saliency Map and Its Application in Bitsteam Extraction for Scalable Video Coding
Wei LIU, Xu CHEN and Yong-sheng LIANG AISE-A143

Obstacle Avoidance Technology of Autonomous Vehicle Based on the Cost Function
Yun-xiao SHAN, Bi-jun LI, Yun XIE and Teng LI AISE-A145

An Optimal Image Matching Model
Yu-jian LI, Shao-feng ZENG, Yong YANG, David M W POWERS and Xi-bin JIA AISE-A146

Restoration of Low-Light-Level Image Based on RBF Neural Network
Ke ZHANG and Li-hong NIU AISE-A152

Integrated Approach to Generate Assembly Process Plan based on Heuristic Rule
Hong-Seok PARK, Jin-Woo PARK and Upendra TULADHAR AISE-A164

Dynamic Performance Simulation and Analysis of Switched Reluctance Motor Based On Matlab/Simulink
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On Automated Online Essay Scoring in Chinese EFL Writing Evaluation
Xi-ming YUAN AISE-A015

Multiple Criteria Decision Analysis Based on Variable Fuzzy Data Envelopment Analysis
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Research on GNAR-GARCH Model and Its Application in Modeling and Forecasting
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Kansei Evaluation and Modeling of AR Products
Kun-chieh WANG and Ling-hsuan WANG AISE-A060

Converting the Format of the Generalized Action Sentence in Chinese-English Machine Translation
Zhi-ying LIU, Yao-hong JIN, Yun ZHU and Yan-bo GUO AISE-A072

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Shu-zhen XIN, Yue-hong SU and Xiao-yan HUANG AISE-A073

Novel Hybrid of Time-Delay Neural Network and Wavelets to Predict Rich-Frequency Patterns: Application to Gait Biomechanics

Manufacture of Screw Turbine and Placement of the Generator in the Screw Turbine Shaft Used for Small-scale of Micro Hydro Electrical Generating

Hendra [1,a,*] and Anizar Indriani [2,b]

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Keywords: Micro-hydro, Screw Turbine, Water, Generator

Abstract. Screw turbine was developed as alternative micro-hydro power plants. Its working principle is to use the river or irrigation with low discharge. The water flows into the turbine will drive the blades of screw turbine to rotate. Rotation of screw turbine will be forwarded to generator for converted into electrical energy. In this paper we will focus on the manufacturing process for small -scale of screw turbine to generate electricity voltage. Manufacturing process of screw turbine component as micro-hydro power plant consists of two components such as mechanical and electrical components. Mechanical components consist of a screw turbine, home of turbine screw, shaft of turbine and bearings. The manufacturing process includes the cutting plate process, drawing process and joining. Electrical component is a generator with the rotor (magnets) and the stator (coil) and then assembly the mechanical and electrical components. After the assembled all component then followed performance testing of the screw turbine and generator. From the manufacturing process of screw turbine and generator are obtained the results of rotation and electric voltage.

Introduction

Demand of requirement of current electrical energy are increase with the high growth of the community and the equipment used electrical energy, such as electricity for housing, electricity for transportation (electric rail), household appliances and etc. Electrical energy can be generated by power plants like hydroelectric power plant [1, 2], steam power plants, diesel power plants, solar power plants, and wind power plants and nuclear. A resource of energy for diesel power plants is decreased such as petroleum and also for steam power plants having some disadvantages such as expensive and environmentally unfriendly. This encourages people to searching for sources of energy and technologies of power generating alternative as generating power electric such as hydro, solar, and wind powers. For cultivate this energy source is require some equipment such as solar cell, water turbines and windmills.

Technology and equipment of generating power electric has been developed on a small scale and large to produce the electric voltage by using the energy water sources. Large-scale generating power electric produce the hundreds of thousands of megawatts with using large area and concentrated field such as lake or dam. For small-scale electric power can be obtained by utilizing a small area, discharge and head low. For examples is screw turbine[3,4] where as can be used for small area, decentralized and also source of the water obtained from the flow of the river and irrigation.

For areas that have a river or stream irrigation by using of screw turbine engines are very useful as power plants. Micro-hydro power plants with a screw turbine can be made by a simple manufacturing process includes cutting process, drawing, joining and assembly.

Focused in this study is on the process of manufacturing process a component of micro-hydro power plants by a small -scale screw turbine mechanism with output rotation is 330 rpm. Power plant machine is expected to be used by the community in meeting the needs of a stable electrical energy.

Methodology Manufacture and Testing of Micro Hydro Power Plant with Screw Turbine

Micro- hydro power plants by utilizing screw turbine consists of two parts or components, namely:

1. Mechanical components which consist of a blade screw turbine and shaft, the screw turbine, shaft and bearings.
2. Electrical components as generator of electric which consists of a rotor and stator.

Component of micro hydro power plant with screw turbine includes:

1. Mechanical component of micro-hydro power plant
   Mechanical components micro hydro power plant consists of blade of screw turbine, housing turbine and frame holder of screw turbine. Screw turbine is rotated by water flow from irrigation or Small River that flows from height of head water about 1 meter or more. The component of screw turbines are shown in Fig. 1 and Fig. 2 show the dimension of screw turbine. Blade of screw turbine made of aluminum with a thickness of 1.5 mm, shaft of screw turbine from PVC material. Material of shaft and frame of holder screw turbine are steel and iron for turbine house as shown in Fig. 3.
2. Electrical components of micro hydro power plant
   Electrical components that used is a generator that functioning to convert the mechanical energy of the mechanical components (screw turbine) into electrical energy. Component generator consists of rotor and stator as shown in Figs. 3g and 3h.

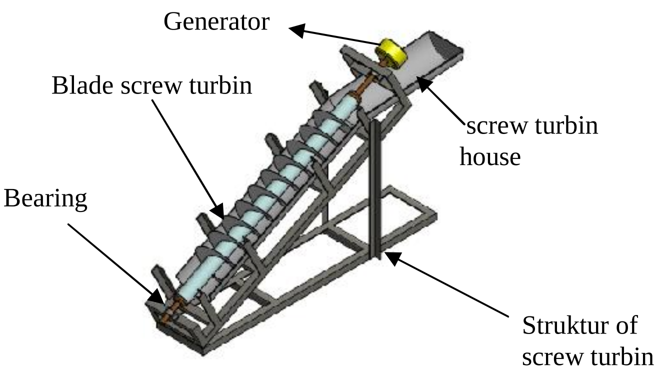

Figure 1 Screw turbine

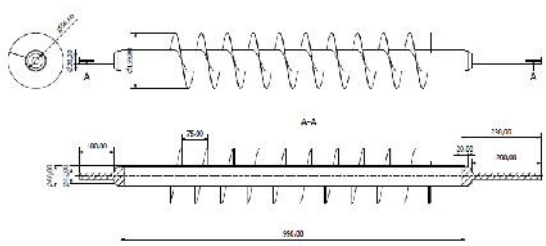

Figure 2 Dimension of Screw turbine

Manufacture of mechanical components of micro hydro power plant (Screw turbine)

Manufacture process of micro-hydro power plants is done by making a screw turbine as a mechanical component. Stages of manufacture process of screw turbine consist of:

1. Preparation of materials component for the manufacture such as plate (aluminum, shaft, PVC pipes and bearings).
2. Manufacture of screw turbine.
   Manufacture of screw turbine component consists of several steps:
   a. Cutting thin plate to form a circle and cutting of the half of upper circle parts to be molded into the blade screw with the drawing process.
   b. The process of forming screw blade with drawing blade is made with a 10 blade of screw turbine where as outer diameter of blade of screw turbine is 70.8 mm and inner diameter is 20.8 mm.
   c. Joining blade of screw turbine to shaft turbine.
   d. Manufacture of screw turbine house with rolling and welding processes.
   e. Assembling the entire components screw turbine.
3. Rotation testing of mechanical components of screw turbine.

The resulting of rotation testing is done by flowing water to rotate screw turbines and measured by tachometer. Rotation was measured by making a variation in height of the base frame screw turbine such as 450 mm, 550 mm and 650 mm with a total volume of water are 1 gallon and 100 liters.

a. Blade of Screw

b. Shaft of blade Screw turbine

c. blade and shaft of screw

d. Shaft of Screw turbine

e. Bearing

f. Structure of screw turbin

g. Rotor of generator

h. Stator of generator

Figure 3 Komponen Pembangkit Listrik Tenaga Mikrohidro Mini

Electrical component manufacturing micro hydro power plant (generator)

The resulting of electrical component is composed of generator where as consisting of stator and rotor. Rotor is part of generator that contains the magnet while stator contains the coil windings. Number of magnets used in rotor and stator is 6 magnet and 6 coil windings. Manufacturing process of generators includes:

1. Preparation generator components such as magnet rotor and coil windings stator.
2. Manufacture and testing of coil windings.

Number of coil windings is made according to the conditions generated by rotation of screw turbine. Testing of coil windings and magnet performed with the electric motor before the magnet and coil windings mount on a screw turbine and then electric motor output of the coil windings is measured using a Multimeter. After performance testing of coil windings and magnet followed by mounting of magnet and coil windings on the frame holder of screw turbine. The installation of magnets and coil windings to screw turbine are shown in Fig. 5. Results show that rotation of coil windings at 1400 rpm produced the voltage of 750 volts. While for 270 rpm rotation obtained voltage is 70 volts.

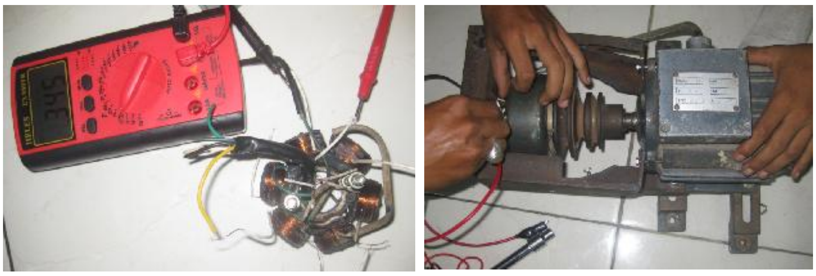

Figure 4. Testing of Magnet Function by Motor

Figure 5. Assembly of Magnet Motor on Screw Turbine

Results of Performance Screw Turbine Machine for Generating Electrical Micro Hydro Power

Performance of screw turbin depends on the volume of water flow and height head of water. When the volume of water flow and height head is big then the rotation of screw turbine becomes high. This is due to the contact area become large on blade of screw turbine and pressure the blade to move rotate. Results of measurement rotation of screw turbine are shown in Table 1. Table 1 and Fig. 6 shows that the highest rotation appears at the 650 mm of height head with volume of water 19 liters are 166.5 rpm. For height head 450 mm obtained the rotation of generated is 134 rpm. Results for volume of water 100 liters with a height of 650 mm obtained by rotation of 330 rpm and 450 mm at the head of 165 rpm. The result shows that the height head affects the rotation as for screw turbine with small dimension is obtained 165 rpm, 268 and 330 rpm.

Table 1. Rotation and head of screw turbine with volume of water 19 and 100 liters

Volume	Head (mm)	Putaran (rpm)
19 l	450	134
19 l	550	165

Volume	Head (mm)	Putaran (rpm)
100 l	450	165
100 l	550	268

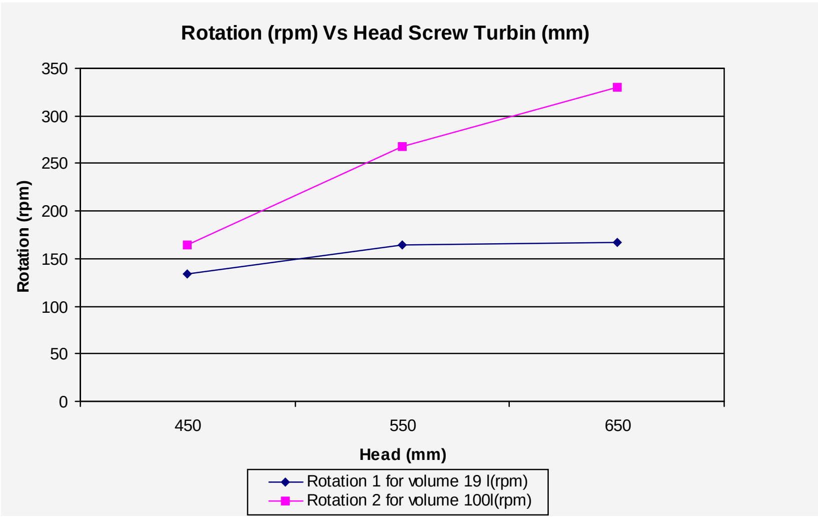

Figure 6. Rotation and head of screw turbine with volume of water 19 and 100

Conclusion

The conclusions are given as following:

1. Performance of screw turbine depends on the volume of water flow and height head of water. When the volume of water flow and height head is big then the rotation of screw turbine becomes high. This is due to the contact area become large on blade of screw turbine and pressure the blade to move rotate.
2. Results of measurement rotation of screw turbine show the maximum value of rotation appear at the 650 mm of height head of water on 19 and 100 liters volume of water flow.
3. In this paper, manufacture of screw turbine with small dimension can be producing the rotation about 330 rpm.

Acknowledgement

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