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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	Study on low pressure evaporation of fresh water generation system model			
Jumlah Penulis	:	5			
Status Pengusul	:	penulis ke-3			
Identitas Jurnal Ilmiah	:	a.	Nama Jurnal	:	Journal of Mechanical Science and Technology
		b.	Nomor ISSN	:	1738-494X (Print) 1976-3824 (Online)
		c.	Vol, No., Bln Thn	:	26, 2, February 2012
		d.	Penerbit	:	Korean Society of Mechanical Engineers (Springer Nature Switzerland)
		e.	DOI artikel (jika ada)	:	
		f.	Alamat web jurnal	:	https://link.springer.com/article/10.1007/s12206-011-1102-8
			Alamat Artikel	:	https://eprints2.undip.ac.id/1512/1/Study%20on%20low%20pressure%20evaporation%20of%20fresh%20water%20generation%20system%20model.pdf
		g.	Terindex	:	Scopus

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Semarang, 24 Maret 2020
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NIP. 197102071995121001
Unit Kerja : Fakultas Teknik Universitas Diponegoro
Bidang Ilmu : Teknik Kimia

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NIP. 197403262000031001
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Bidang Ilmu : Teknik Mesin

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Study on low pressure evaporation of fresh water generation system model (Article)

Chung, H.[a], Wibowo, S.[b], Fajar, B.[c], Shin, Y.[b], Jeong, H.[a]

[a]Department of Mechanical and Precision Engineering, The Institute of Marine Industry, Gyeongsang National University, Tongyeong 650-160, South Korea
[b]Department of Mechanical and Precision Engineering, Graduate School, Gyeongsang National University, Tongyeong 650-160, South Korea
[c]Department of Mechanical Engineering, University of Diponegoro, Semarang, Indonesia

Abstract

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A low pressure evaporation fresh water generation system is designed for converting brackish water or seawater into fresh water by distillation in low pressure and temperature. Distillation through evaporation of feed water and subsequent vapor condensation as evaporation produced fresh water were studied; tap water was employed as feed water. The system uses the ejector as a vacuum creator of the evaporator, which is one of the most important parts in the distillation process. Hence liquid can be evaporated at a lower temperature than at normal or atmospheric conditions. Various operating conditions, i. e. temperature of feed water and different orifice diameters, were applied in the experiment to investigate the characteristics of the system. It was found that these parameters have a significant effect on the performance of fresh water generation systems with low pressure evaporation. © 2012 The Korean Society of Mechanical Engineers and Springer-Verlag Berlin Heidelberg.

SciVal Topic Prominence

Topic: Desalination | Solar heating | Slope solar

Prominence percentile: 99.203

Author keywords

Distillation | Ejector | Fresh water generation | Low pressure

Indexed keywords

Engineering uncontrolled terms: Atmospheric conditions | Brackish water | Distillation process | Feed water | Fresh Water | Fresh water generation | Low pressures | Operating condition | Orifice diameters | System use | Tap water | Vapor condensation

Engineering controlled terms: Distillation | Ejectors (pumps) | Evaporation | Phase transitions | Seawater | Water vapor

Engineering main heading: Atmospheric temperature

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Saleh, A. , Al-Nimr, M.A.
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Experiment study on fresh water generation system utilizing vacuum evaporation
Wibowo, S. , Lee, K. , Heo, D.

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Jeong, H.; Department of Mechanical and Precision Engineering, The Institute of Marine Industry, Gyeongsang National University, South Korea; email:hmjeong@gnu.ac.kr

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Spectral kurtosis based on AR model for fault diagnosis and condition monitoring of rolling bearing †

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(Manuscript Received July 14, 2010; Revised September 13, 2011; Accepted October 10, 2011)

Abstract

Spectral kurtosis (SK) is an algorithm that gives an indication of how kurtosis varies with frequency. A frequency band that contains abundant information, especially the impact signal, can be tracked by calculating SK. In the present article, SK combined with Autoregressive AR model, was applied into the fault diagnosis and condition monitoring of bearings. Accelerated life test of rolling bearings in Hangzhou Bearing Test & Research Center (HBRC) was performed to collect vibration data over their entire lifetime (normal–fault–failure). The result shows that SK can detect early incipient fault by eliminating some other interfering frequency components. In addition, it can detect fault 5 min earlier than root mean value (RMS). This fault detection in advance is significant for condition monitoring.

Keywords: Spectral kurtosis; Fault diagnosis; AR model; Condition monitoring; Rolling bearing

1. Introduction

Rolling element bearings are at the heart of almost every rotating machine. Fault detection and diagnosis of rolling bearings are gaining importance in preventing malfunction and failures. A number of works have been done in this field [1-3].

Vibration measurement and analysis have been extensively used in bearing diagnostics [2, 4]. When fault occurs in the rolling bearing, the fault interacts with other rolling surfaces, resulting in amplitude-modulated vibration signals. The envelop analysis is a well-known method used to extract bearing defect frequency components [2, 5, 6]. Hilbert transform can be used to perform envelope analysis efficiently [2].

However, the vibration signals with faults are always severely corrupted by strong background noise from all other vibration sources in the machine under inspection. Therefore, spectral kurtosis (SK) is introduced as a filter prior to the application of Hilbert transform.

SK was first introduced by Dwyer in [7] as a statistical tool that "can indicate not only non-Gaussian components in a signal but also their locations in the frequency domain." Antoni proposed a formalization of SK using Wold–Cramer decomposition of "conditionally non-stationary" (CNS) processes, which partially fills the deficiency of formal definition and a well-understood estimation for SK [8]. It is a statistical parameter that indicates how the characteristic of a signal varies with frequency. Many rotating machines produce series of impacts—at least in their early stage of development—which, in turn generates transient vibration signals during faults, such as spalling, pitting, or cracking, in critical mechanical components.

The present paper is organized as follows. The definition of SK, which can be used as a tool for fault detection, is first given. The main issue presented in the present paper is how SK can be used to detect fault signals and help in designing more sophisticated detection filters that extract fault signals from background noise. Simulated signals are provided to show that SK has the capability of tracking fault signals masked by strong background noise. Then, in the next section, the autoregressive (AR) model is incorporated into SK as a pre-process. In Section 3, the combination is applied to the diagnosis of the rolling bearing for the accelerated life test. This part of the paper shows the excellent ability of SK to track fault signals. In Section 4, the accelerated bearing life test is performed to validate the excellent features of SK in detecting early incipient fault, very useful for condition monitoring. In Section 5, conclusion is provided that shows that SK is very important in fault diagnosis and condition monitoring.

2. Fault detection using SK

2.1 Model of the signal

As explained in the introduction, the measured signal $Y(t)$ is a mixture of fault signal $X(t)$ and some strong additive noise $N(t)$

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Effects of camber angle control of front suspension on vehicle dynamic behaviors †

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(Manuscript Received September 1, 2010; Revised July 11, 2011; Accepted September 30, 2011)

Abstract

This paper proposes a new electronic camber suspension mechanism in which the suspension geometry rather than brake and driving torques is controlled to improve the cornering performance. The new camber angle mechanism is made available in a double wishbone type suspension. The bicycle model is employed to establish the control strategy for the camber angle mechanism. The referenced yaw rate is derived to make the control input. To carry out the control simulation of the full car, ADAMS/Car and MATLAB/Simulink are used. The result of fishhook simulation indicates that the proposed mechanism reduces the camber angle generation and decreases the camber thrust. This makes the vehicle move straight forward easily. The single lane change simulation indicates that the change of camber angle is small and it contributes to the short cornering and fast straight forward ability.

Keywords: Vehicle dynamics; Electronic active suspension; Camber angle; Handling performance

1. Introduction

The engine, tire, and suspension are the important components that determine the vehicle performance. In recent years, the information about the vehicle running state is gathered by the electronic control unit (ECU) which enables the vehicle to overcome dangerous conditions by the proper control logic. Bong et al. [1] have studied the intelligent torque distribution control for the 4 wheel driving car. Song et al. [2] carried out the performance evaluation of electronic stability program (ESP) systems for enhancing the lateral stability during cornering. Zhange et al. [3] used the quantitative feedback theory to develop the active front steering system (AFS). The electrical stability control (ESC) gives the vehicle lateral stability in severe conditions through the independent control of each brake. ESC gives good performance in severe conditions and low friction road conditions, but the velocity decreases and the comfort is reduced during operation. The continuous damping control (CDC) uses the semi-damping system to improve the ride ability but it has little effects on yaw rate control on the low road condition [4]. The requirement on vehicle behavior relating to tire performance has become complicated. Tire makers should develop exclusive tire for each new vehicle because of the suspensions characteristics such as camber angle and toe angle. These suspension characteristics have constraints on the tire alignments which lead to the tire's loss of potential. While a vehicle is turning, the lateral forces are used. A lateral acceleration increases along with a roll angle, the camber angle leans toward an external direction, which decreases lateral forces and eventually limits tire performance as well. If the camber angle is directly controlled, the vehicle can make the most of the tires potential. This is the basic concept of the variable camber suspension which maximizes vehicle handling performance. If the active camber suspension mechanism is used, the handling performance can be enhanced without the loss of velocity unlike ESC.

Isao et al. [5] proposed a variable camber suspension model to improve the handling performance of vehicle. They suggested the double knuckle type suspension that had no control algorithm for the variable camber suspension.

In this study, we developed a new active camber suspension mechanism called "bicycle model" which controls the camber angle of the front suspension. To verify the active camber suspension mechanism, the fishhook and single lane change simulations are carried out. ADAMS/Car program is employed to perform the full vehicle simulation. The bicycle model is used to make the control algorithm, and ADAMS/control simulation is carried out under the MATLAB/Simulink environment.

This paper is organized as follows. Section 2 proposes and describes a new electronic camber suspension mechanism. The control algorithm for camber geometry is shown in section 3. The full car simulation is explained in section 4. Finally, conclusions are presented in section 5.

† This paper was recommended for publication in revised form by Associate Editor Kyongsu Yi
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