

**MEMOIRS OF FACULTY OF ENGINEERING
UNIVERSITY OF MIYAZAKI
No. 51, November 2022
CONTENTS**

Original Articles

Muhammad Irfan, Hiroshi SHIMAMOTO Exploring the impact of COVID-19 on transportation using Structural Equation Modeling	1
Masataka HONDA, Yuzuki SHIOGAMA, Chihiro MORITA, Kentaro YASUI, Yukari NAKAMARU Fundamental Study of Utilization of SfM in Restoration Design of Small and Medium Span Bridges	7
Yutaka DOTE, Yuta KATSUNAGA, Tomoo SEKITO Effect of External Concentration on The Leaching Concentration of Easily Soluble Salts from Cement Solidified Fly Ash.....	15
Yutaka DOTE, Daiki MUTO, Tomoo SEKITO Performance Evaluation of Batch Reactor for Nitrogen, Phosphorus and Potassium Recovery from Swine Wastewater	23
Yoshiki TANAKA, Kenta NAKAI, Yunosuke OKUMURA, Akihiro KAMEYAMA, Masahito KATTO, Atsushi YOKOTANI Development of Focusing and Irradiating System for Laser-stimulated Desorption Spectrometer	29
Koji MAEDA, Tomohito OHAMA, Yuto IWAKIRI, Masakazu ARAI, Takeshi FUJISAWA Mid-infrared Emission Process of InAs/GaSb Superlattices with Constant InAs Layer Thickness Grown by MOVPE Method	35
Yasushi HIRATA, Shota NAKAGAWA, Masakazu ARAI, Koji MAEDA Zn-doped InAs Films grown on GaAs Substrates Prepared by MOVPE method Evaluated by Raman Spectroscopy	41
Shogo HARADA, Kosuke MORITA, Hiroki OHYAMA, Tomoki HARADA, Tetsuo IKARI, Atsuhiko FUKUYAMA Evaluation of thermal properties of semiconductors by using a laser heterodyne photothermal displacement measurement (1) Construction of theoretical analysis model.....	45
Kosuke MORITA, Shogo HARADA, Hiroki OHYAMA, Tomoki HARADA, Daisuke OHORI, Seiji SAMUKAWA, Tetsuo IKARI, Atsuhiko FUKUYAMA Evaluation of thermal properties of semiconductors by using a laser heterodyne photothermal displacement measurement (2) Measurement and calculation of Si-NP/SiGe composite film	51
Naoki YAMAMOTO, Shintaro KOMABA, Masakazu SUGIYAMA, Tetsuo IKARI, Atsuhiko FUKUYAMA Optical Characterization of wire-on-well structure by Photoreflectance measurements	57

Riku SAKODA, Tatsuhiko YATABE, Masakazu ARAI, Tetsuo IKARI, Atsuhiko FUKUYAMA	
Transition energy evaluation of InAs/GaSb superlattice using Photoluminescence and Photoreflectance measurements.....	63
Tin Tin CHO, Ryo TORIHARA, Tatsuya SAKODA, Noriyuki HAYASHI	
Effect of Supercapacitor on Transient Response of Thermoelectric Generation Systems	69
Wataru MORI and Tatsuya SAKODA	
Optimal arrangement of TEV sensors for diagnosing oil-filled transformer	79
Ryota YAMANAKA, Shigeki TOMOMATSU, Yoshinori NAGASE, Masatoshi KIMURA, Ryota NAGATOMO	
Study of Organic Rankine Cycle with Twin Screw Expander	83
Tatsuya KUSUNOKI, Shigeki TOMOMATSU, Yoshinori NAGASE, Msatoshi KIMURA, Syunsuke TSUJI	
A Study on Increasing Efficiency of Compressed Air Engine for Solar Thermal Power Generation	89
Masato KONDO, Yoshinori NAGASE, Yuma WATAYO, Shigeki TOMOMATSU, Masatoshi KIMURA	
Development of a Heating Device of Retort using Beam Down Solar Concentrators	95
Kenjiro HASHIKI, Yasuhiro BONKOBARA, Yuno KATAGI, Kazuhiko TAKASHIMA, Takayuki HAMAHATA	
Development of withering machine for fresh tea leaves manufacturing using vibration	101
Yuki UWAI, Yasuhiro BONKOBARA, Nobo UEOKA, Takayuki HAMAHATA, Shinichi TERAZONO	
Development of three component velocity sensor for borehole seismometers	107
Atsushi KUROKI, Seiha HARADA, B. SHIN	
Aerodynamic Characteristics of NACA4412 Airfoil in the Region of Reynolds Number 10^4	113
Seiha HARADA, Atsushi KUROKI, B. SHIN	
Gap Ratio Effect on the Wake behind Side-by-Side Plates	117
Bayu K. WARDHANA, B. SHIN	
Numerical Investigation of the Aerodynamic Performance of NREL S809 Airfoil for Wind Turbine	123
Takahiro UEDA, Tetsuro KATAYAMA	
Proposal and Implementation of Gamma Which Is a Spatial Data Sharing Distributed MQTT System	129
Kensuke SUGA, Tetsuro KATAYAMA	
Proposal of an Automatic Generation Method of Class and Instance Variable Definitions in VDM++ Specification from Natural Language Specification Using Machine Learning	135

Takafumi MUTO, Tetsuro KATAYAMA Extension to Expand the Scope of Application of BWDM to Generate Test Cases from VDM++ Specifications	141
Noriko KAWASAKI A Pilot Study on the VR English Program for Engineering Students	147
Noriko KAWASAKI Survey on the Cultivation of Engineering Students' Cross-cultural Understanding and Their Related Activities	153
Taketo KAMASAKA, Makoto SAKAMOTO Study on Design Tool of Hula Costumes	159
Kodai MIYAMOTO, Makoto SAKAMOTO Study on Educational Support for Elementary School Students Using Virtual Technology	169
Ryoya YOSHIMURA, Kensuke NISHIOKA, Yoshihiro SUZUKI Influence of Metal Cations on Cell Performance Degradation of Polymer Electrolyte Membrane Water Electrolyzer	177
Ryoya YOSHIMURA, Kensuke NISHIOKA, Yoshihiro SUZUKI Ionic Permselectivity on Membrane Electrode Assembly for Use of Soft Water on Polymer Electrolyte Membrane Water Electrolysis	181
Yusuke SHIGEEDA, Akira NAGAOKA, Kenji YOSHINO, Kensuke NISHIOKA Impact of Alloying on Thermoelectric Properties in Tetragonal Chalcopyrite Compound ZnSnSb ₂	185
List of Master's Thesis	189
Others	192