Memoirs of the
FACULTY OF ENGINEERING
KYOTO UNIVERSITY

VOLUME XXV

1963

Published by
KYOTO UNIVERSITY
KYOTO, JAPAN

CONTENTS

PART 1

PAGE

On the Velocity Defect Law of Open Channel Flow. ... Yoshiaki IWASA and Yoshio MURAMOTO 1

A Study of the Machinability of Metals. (Effect of Microstructure on cutting mechanism, tool life, and surface finish). ..... Keiji OKUSHIMA and Kazuaki IWATA 12

Uniqueness Criterion of Stress State of Maxwell Type Viscoelastic Body ..... Tatsuo TOKUOKA 33

On the Design of the Kyoto University Digital Computer KDC-I. ..... Takeshi KIYONO, Toshiyuki SAKAI and Shuzo YAJIMA 38

Two-Stage Parametric Amplifier Coupled Through Idler Wave. ..... Jun-ichi IKENOUE and Masamitsu NAKAJIMA 63

Effects of Aluminium, Sulphur and Vanadium on the Solubility of Craphite in Liquid Iron ..... Toshisada MORI, Kimio FUJIMURA and Hideo KANOSHIMA 83

A Physico-chemical Study of Elastomeric Polyurethans. ..... Atsuo NAGASAWA, Hisao KITANO and Kenichi FUKUI 106

Analysis of the Drying Process of Granular and Powdered Materials During the Falling Rate Period. ..... Ryozo TOEI, Shinya HAYASHI and Morio OKAZAKI 116

Statistical Analysis on Stream Pollution, II. Time Series Analysis on Stream Pollution of the Yodo River. ..... Hikaru SHOJI and Takeo YAMAMOTO 134

Studies on Through Flow Rotary Dryer. ..... Masakatsu HIRAOKA and Ryozo TOEI 144

PART 2

Improvement of the Non-Stationary Response by the Introduction of a Non-Linear Element of Zero-Memory Type. ..... Yoshikazu SAWARAGI, Yoshifumi SUNAHARA and Takayoshi NAKAMIZO 153

Effects of Alloying Elements on the Activity of Nitrogen in Austenite. I. Effects of Chromium and Manganese. ..... Toshisada MORI, Kyozo SHINMYO, Eiji ICHISE and Akira MOROOKA 164

PAGE

Effects of Alloying Elements on the Activity of Nitrogen in Austenite. II. Effect of Nickel and Solubility of Nitrogen in Pure Iron.....Toshisada MORI, Kyozo SHINMYO, Eiji ICHISE and Shinji KOYAMA.....175

The Stress and the Earth Pressure Phenomena in the Rocks around Shaft Bottom Spaces.....Yoshio HIRAMATSU and Yukitoshi OKA.....188

Strain Measurements of Prestressed Concrete Cylindrical Tank Walls.....Kiyoshi OKADA and Shinzo NISHIBAYASHI...203

On the Coupled Free Vibrations of a Suspension Bridge-(I).....Naruhito SHIRAISHI ...217

Effects of Mass Transfer Rate and its Expressions on Dynamics of Mass Transfer Operation. .....Takeichiro TAKAMATSU and Eiji NAKANISHI 233

The Magnetic Tape System of the Kyoto University Digital Computer KDC-I. .....Takeshi KIYONO, Toshiyuki SAKAI and Shuzo YAJIMA 244

A Study on the Space and Energy Dependent Reactor Kinetics, with Direct Physical Interpretation of the Effective Neutron Lifetime and Criticaity Factor. .....Hiroshi NISHIHARA and Seiji UKAI 264

PART 3

The S_4 and Few-Group Diffusion Calculations of Fast Reactors.....Masao OHTA, Hiroshi NISHIHARA and Yoko DEGUCHI 273

Frequency Response of Servomechanisms with Nonlinear Friction. .....Michiyoshi KUWAHARA 287

Electron-Microscopic Investigation on Precipitation Phenomena in Aluminium-Zinc Alloys. .....Yotaro MURAKAMI, Osamu KAWANO and Hideaki TAMURA 303

A Study on the Control Performance of Relay Control Systems Subjected to a Random Input.....Yoshikazu SAWARAGI, Yoshifumi SUNAHARA and Takayoshi NAKAMIZO...323

Study on the Electrostatic Concentration of Low Ash Coal in Corona Discharge Field. .....Shigeru MUKAI, Takahide WAKAMATSU and Yoshihisa SHIDA 334

PAGE

PART 4

Existing Conditions for Self-Oscillation in an Improved On-Off Control System. ..... Yoshikazu SAWARAGI and Yoo YONEZAWA 359

Heat Transfer in a Turbulent Boundary Layer with Pressure Gradient. ..... Busuke HUDIMOTO 371

A Study of Economical Machining. (An Analysis of the Maximum-Profit Cutting Speed). ..... Keiji OKUSHIMA and Katsundo HITOMI 377

Reducing Effect in Footing Resistance Against Heavy Impulse Current. (Observation of Streamer in the Soil). ..... Tatsuro OKUBO and Muneaki HAYASHI 384

An Experiment on Phrase Structure Analysis by an Electronic Computer..... Takeshi KIYONO and Akira SAKAGUCHI 406

An Approximate Analysis of the Transient Stability of One- or Two-Machine Systems..... Shigenori HAYASHI and Jūrō UMOTO 413

An Analysis of Non-Linear Sampled-Data Feedback Control Systems. ..... Shigenori HAYASHI and Kōichi MIZUKAMI 427

Dynamic Stresses Induced within Rock in Case of Blasting with One Free Face..... Ichiro ITO and Koichi SASSA 440

The Temperature and Moisture Profile of Material by Drying during the Falling Rate Period and the Asymptotic Temperature of the Moist Part.... Ryozo TOEI and Shinya HAYASHI 457