

PROCEEDINGS

VOLUME I	Session S-1: Unsteady Flow I Session S-2: Fluid Machinery Applications I Session S-3: Stability and Transition Session S-4: Aero & Hydro-Acoustics Session S-5: Unsteady Flow II Session S-6: Computational Fluid Dynamics I
VOLUME II	Session S-9: Computational Fluid Dynamics II Session S-10: Fluid Machinery Applications II Session S-11: Turbulence Session S-12: Internal Flow I Session S-13: Computational Fluid Dynamics III Session S-14: Fluid Machinery Applications III Session S-15: Turbulence Session S-16: Internal Flow II
VOLUME III	Session S-21: Thermofluids Session S-22: Aerodynamics Session S-23: Convection Session S-24: Two-Phase Flows Session S-25: Measurements Techniques Session S-26: Industrial Applications Session S-27: Special Topics I Session S-28: Special Topics II

VOLUME I

Session S-1: Unsteady Flow I

Tuesday, January 3, 1995

Chairs: S. A. Mikhail, J. Iwamoto

Control of Transients by using Check Valves through Pressurized Piping System

S. M. Abdel-Gawad, A. S. Elansary, and A. A. Kassem

Cairo University, Egypt

1-13

Numerical Solutions of Unsteady Turbulent Flow around a Two Dimensional Hydrofoil in Truncated Domains

K. K. Hassan, and S. Abdallah

University of Cincinnati, U.S.A.

15-26

A Dynamic Model for Predicting the Transient Response of Liquid Rocket Engines

F. M. Owis, A. A. Hashem, and M. B. Argoun

Cairo University, Egypt

27-39

Flow Oscillation in a Duct with Abrupt Enlargement

M. Yoshinaka, and J. Iwamoto

Tokyo Denki University, Japan

41-49

Self-excited Impinging Jet Flow

A. Haga, and Y. Hosoi

Railway Technical Res. Inst. - Tokyo Denki University, Japan

51-58

Session S-2: Fluid Machinery Applications I

59

Tuesday, January 3, 1995

Chairs: H. Heikel, M. Rautenberg

Effect of Pitch Ratio on the Secondary Flow Generated in a Very Low Aspect Ratio Rectilinear Turbine Cascade

M. B. Hanna, and K. Weskamp

Minia University, Egypt -

Institute of Jet Prop, and Turbo, WRTH Aachen, Germany

59-80

An Experimental Investigation and Numerical Computations of a Wedge Blade Radial Diffuser

A. Mobarak, M. Khalafallah, A. Mostafa, and R. Esmail

Cairo University, Egypt

81-101

The Development of a Low Loss Vaned Flow Conditioner

E. M. Laws, and A. K. Ouazzane

University of Salford, UK

103-108

Numerical Simulation of 3D Separated Flow through Multistage Turbomachine
S. V. Yershov
Ukrainian National Academy of Sciences, Ukraine 109-118

Session S-3: Stability and Transition 119

Tuesday, January 3, 1995

Chairs: M. F. Khalil, S. Ragab

Similar Effects of Temperature and Viscosity on the Stability of Supersonic Boundary Layer
M. A. Elsharnoby, and M. H. Metwally
Banha Higher Inst. of Tech. - Military Technical College, Egypt 119-131

Transition Control in Flow over a Roughness Element by a Heating Strip
J. A. Masad
High Technology Corp., U.S.A. 133-140

Effect of Crossflow on Gortler Instability in Incompressible Boundary Layers
Y. H. Zurigat, and M. R. Malik
University of Jordan, Jordan - High Technology Corp., USA 141-150

Transition Flow Regimes in a Series of Adjacent Rectangular Jets
A. Cavaliere, M. El-Naggar, R. Ragucci, G. Vancore, and C. Venitozzi
University of Federico II, Italy 151-162

Investigation of Laminar Boundary Layer Stability at Combined Action of Different Factors
A. F. Slitenko
Turbomachinery Research Institute, Ukraine 163-170

Session S-4: Aero & Hydro-Acoustics 171

Tuesday, January 3, 1995

Chairs: M. Sedrak, A. Lyrintazis

Numerical and Experimental Investigation of the Effect of Sampling Rate, Noise and Resonance on Measuring Higher Moments of Single and Multiple Frequency Signals
M. S. Mohamed
Cairo University, Egypt 171-186

Analysis of Sound Propagation in a Circular Duct to Improve the Accuracy of in-Duct Noise Measurement
E. A. Yaseen
Zagazig University, Egypt 187-199

Acoustic Wave Analysis in a Standing Wave Tube using the Transfer Function Method
E. A. Yaseen
Zagazig University, Egypt 201-214

A Passive Noise Reduction Method for Internal Flows Generating Self-Sustained Tones
C. Favé, R. Henry, S. Soreefan, and O. Boisseau
University de Poitiers, France 215-221

Discrete Frequency Noise Generated by an Air Jet from a Rectangular Slit (Conditions of the Discrete Frequency Noise Generation)
I. Kouno, and T. Fukano
Fukuoka institute of Technology - Kyushu University, Japan 223-232

Session S-5: Unsteady Flow II 233

Tuesday, January 3, 1995

Chairs: Z. Safar, R. Henry

Pressure Simulation of Pulsating Flow in Duct with Nozzle
M. Endo, and J. Iwamoto
Tokyo Metropolitan College of Technology -
Tokyo Denki University, Japan 233-242

Early Stage of an Impulsively Started Flow around a Square Cylinder
Y. P. Xu, T. S. Lee, and S. H. Winoto
National University of Singapore, Singapore 243-250

Numerical Study of Laminar and Turbulent Pulsatile Flows in Pipe
Z. D. Shi, T. S. Lee, and S. H. Winoto
National University of Singapore, Singapore 251-255

Numerical Study of Low-Frequency Flow Instability in an Axial Transonic Compressor Stage
V. I. Gnesin
Ukrainian National Academy of Sciences, Ukraine 257-267

Effect of Gust on Wind Flow around a Low Rise Building
S. S. Ayad
Zagazig University, Egypt 269-282

Session S-6: Computational Fluid Dynamics I 283

Tuesday, January 3, 1995

Chairs: S. M. Morcos, O. Kandil

A CFD Teaching Programme for the Mechanical Engineering Undergraduates Years
S. B. Chin, G. Cardew, D. Savas, and W. A. Bullough

University of Sheffield, UK	283-292
Numerical Simulations of Incompressible Laminar Flow in a T-Junction of Circular Pipes <i>P. A. Russell, and S. Abdallah</i> University of Cincinnati, USA	293-302
A Computational Study of Transonic Three-Dimensional Steady Flow <i>E. Turkbeyler, and W. M. Pun</i> Imperial College of Science, Technology and Medicine, UK	303-312
Numerical Study of Viscous Effect on Separation Bubble in Underexpanded Impinging Jet <i>Y. Sakakibara, and J. Iwamoto</i> Tokyo Denki University, Japan	313-320
Accuracy of Approximate Solutions in Fluid Mechanics <i>A. Sakurai</i> Tokyo Denki University, Japan	329-338

VOLUME II

Session S-9: Computational Fluid Dynamics II	339
Wednesday, January 4, 1995 Chairs: M. Abou-Ellail, M. M. Hafez	
Numerical Modeling of the Hydrodynamics of Flows in the Case of the Regulation of the Run Off in River Beds <i>N. N. Belayev, and V. K. Khrusch</i> Dniepropetrovsk University, Ukraine	339-346
Development of a Hybrid Shock-Capturing Scheme and its Application <i>Y. Zhao</i> Nonyong technological University, Singapore	347-357
Numerical Simulation of Natural Convection by a Global Method of Generalized Differential Quadrature <i>C. Shu, Y. T. Chew, B. C. Khoo, and K. S. Yeo</i> National University of Singapore, Singapore	359-367
Implicit Monotonic Difference Schemes of Splitting of the Second Order of Accuracy for Solving the Euler and Navier-Stokes Equation <i>N. N. Belayev, and V. K. Khrusch</i> Dniepropetrovsk University, Ukraine	369-377
Control Volume Accurate Solution of 2D Compressible Navier-Stokes Equations on Unstructured Grid <i>G. de Felice, F. M. Denaro, C. Meola, and F. Sarghini</i>	

University of Naples, Italy 379-388

Session S-10: Fluid Machinery Applications II 389

Wednesday, January 4, 1995

Chairs: A. Hozzyen, G. Khalafalla

A Theoretical and Experimental Investigation on the Influence of Inlet Impeller Geometry on Erosion of Dredge Pumps

M. A. Rayan, N. Gadel-Hak, and S. A. Askr

Mansoura University, Egypt 389-403

An Experimental Investigation for the Effect of Rotor Wake on the Flow within Stator Passage

A. M. Mobarak, M. G. Khalfallah, S. S. Ayad, and A. S. Zedan

Cairo University - Zagazig University, Egypt 405-425

Influence of Longitudinal Pressure Gradient and Streamlined Surface Curvature on the Turbulent Flow Characteristics in Turbine Cascades

A. F. Slitenko, V. M. Kapinos, and V. B. Titov

Turbomachinery Research Institute, Ukraine 426-431

Calculation and Measurement of the Three-Dimensional Flow in Axial Compressor Cascades, with and without End-Bends

M. L. Ugryumov, Y. A. Skob, V. A. Menshikov, and V. I. Pismenniy

Kharkov Aviation Institute, Ukraine 433-442

Numerical Investigation of the 3D Effects for Space Flow through a Turbomachine Stage

V. I. Gnesin, S. V. Yershov, and A. V. Rusanov

Ukrainian National Academy of Sciences, Ukraine 443-452

Session S-11: Turbulence 453

Wednesday, January 4, 1995

Chairs: A. Serag-Eldin, M. Giat

Assessment of Turbulence Models versus Confined Swirling Flows

M. S. Abdel-Salam, E. E. Khalil, A. A. Mostafa, and G. M. Mostafa

Cairo University, Egypt 453-470

Prediction of Strong and Weak Shear Flows Using Second-Moment Closure Models

A. M. El-Baz, and B. E. Launder

University of Manchester, U.K. 471-486

Prediction of Rough Surface Thermal Turbulent Boundary Layer

G. H. Abd-Alla, K. M. El-Shazly, O. E. Abd-Ellatif, and M. F. Abd-Rabbo

Zagazig University, Egypt 487-504

Analysis of Material Line Element Parameters Time History during Decay of Isotropic Turbulence
B. A. Kolovandin
Institute of the Academy of Sciences, Belarus 505-514

Session S-12: Internal Flow I 515

Wednesday, January 4, 1995

Chairs: M. El-Kotb, S. Akaike

Study of Boundary-Layer Flows with Pressure Gradient and Mass Transfer by a Simple Integral Method
G. M. Abdel-Moty
Cairo University, Egypt 515-525

Experimental Investigation of Externally Pressurized Conical Thrust Bearing under Turbulent Lubrication Condition
M. F. Khalil, S. Z. Kassab, and A. S. Ismail
Alexandria University, Egypt 526-539

Laminar Channel Flow with Fluid Injection Accounting for the Flow in the Porous Wall
A. K. Abdel-Rahman, and K. Suzuki
Kyoto University, Japan 541-550

Lubrication Analysis of Externally Pressurized Circular Porous Bearings
A. A. Elsharkawy, S. Z. Kassab, and M. M. Nassar
Kuwait University, Kuwait 551-564

Flow and Friction Loss in Square Duct with Rough Wall
S. Akaike, N. Ohtsuka, M. Nemoto, and I. Nakane
Kanadgawa Institute of Technology, Japan 565-574

Session S-13: Computational Fluid Dynamics III 575

Wednesday, January 4, 1995

Chairs: S. S. Kossa, A. Hamed

Three-Dimensional Euler Computation of the Flow inside an Inducer Stage of a Spatial Turbopump
E. M. El Ghazzani, and A. R. Ridwan
Ecole Centrale de Lyon, France 575-588

Flow Coefficient Analysis of Centrifugal Compressors
A. Engeda
Michigan State University, U.S.A. 589-600

Surface Interaction Models for Particle Trajectories in Engine Components
A. Hamed, Y. D. Jun, and W. Tabakoff
University of Cincinnati, U.S.A. 601-610

Navier-Stokes Solutions for Three-Dimensional Flow Fields in Hydraulic Turbomachines
I. Teipel, and P. Holbein
University of Hannover, Germany 611-620

A Two-Dimensional Flux Vector Splitting Euler Solver
M. Khalil, and A. O. Sherif
Cairo University, Egypt 621-635

Session S-14: Fluid Machinery Applications III 637

Wednesday, January 4, 1995

Chairs: A. El-Ahwany, T. Yasuda

A Comparative Study of the Computed Effects of Glaze and Rime Ice Accretions on Aircraft Propeller Performance
E. M. A. Saleh, M. R. Shaalan, I. M. Shabaka, and A. A. Salman
Cairo University, Egypt 637-650

Pressure Distribution for Radially Outward Turbulent Flow between Stationary and Rotating Disk
A. M. Tolba
Mansoura University, Egypt 651-660

Effect of Spatial Nonstationary Flow Structure in Supplying and Rejecting Devices of Flow Path on a Turbine Stage
V. Gnesin, and V. Solodov
Institute for Problems in Machinery, Ukraine 661-669

Modeling of the Steam Flow with Spontaneous Condensation in a Turbine Stage
A. L. Shubenko
Institute for Problems in Machinery, Ukraine 671-680

A Numerical Approach to Blade-Vortex Interaction in Two-Dimensional Viscous Flow
B. Dong, Y. T. Chew, and B. C. Khoo
National University of Singapore, Singapore 681-689

Session S-15: Turbulence 691

Wednesday, January 4, 1995

Chairs: N. M. Raafat, A. Ogawa

Investigation of Turbulence Model and Numerical Solution in Rotating Coordinate System
W. Qinghuan
Chinese Academy of Sciences, China 691-698

An Experimental Optimization of using Vane Swirlers to Augment Heat Transfer Performance in Turbulent Swirling Tube Flow <i>M. S. Abdel-Salam, E. E. Khalil, A. A. Mostafa, and G. M. Mostafa</i> Cairo University, Egypt	699-710
The Turbulent Structure of the Convection Caused by Instability of Horizontal Interface <i>Q-D Wei, J. Chen, and X-D Du</i> Peking University, China	711-718
Numerical Study of Turbulent Flow through Equiangular Annular Diffusers <i>B. Djebedjian, M. Giat, J. P. Renaudeaux, and M. A. Rayan</i> Conservatoire National des Arts et Metiers, France	719-729
A Study of the Boundary-Layer Development on a Flat Plate with Natural and Artificial Transition <i>A. F. Abdel-Gawaad, A. A. Salman, M. R. Shaalan, and J. M. Shabaka</i> Zagazig University, Egypt	730-747
Session S-16: Internal Flow II	749
Wednesday, January 4, 1995 Chairs: S. M. El-Haggar, M. Shoukry	
An Experiment Study of the Pressure Recovery Coefficient in Sudden Enlargement Square Duct Affected with Two Normal Jets <i>M. M. El-Mayit, A. R. Dyab, and A. Abdel-Fattah</i> Menoufia University, Egypt	749-761
Computational and Experimental Investigation of Laminar Flow past a Finite Flat Plate <i>A. O. Sherif, M. I. Rashed, and A. S. Hussien</i> Cairo University, Egypt	762-775
Synthetic Study on Flow Friction in Pipes <i>T. Yasuda</i> Nihon University, Japan	777-785
Versatile Programming for Lattice Type Irregular Pipe Networks <i>T. Yasuda, and Y. Fujita</i> Nihon University, Japan	787-795
Computational and Experimental Visualization of Viscous Flow through Undulations in Tube <i>T. S. Lee, and H. T. Low</i> National University of Singapore, Singapore	796-801

VOLUME III

Session S-21: Thermofluids **803**

Thursday, January 5, 1995

Chairs: A. S. El-Asfori, J. P. Renaudeau

Momentum and Heat Transport in Confined Coaxial Jets under Axial Pressure Gradient and at Variable Momentum Ratios
M. S. Mohamed, A. A. Mostafa, and M. El-Sallak
Cairo University, Egypt 803-815

Thermodynamic Study on Reducing the Power Requirement of Mechanical Vapor Recompression
M. Rautenberg, and D. Burhorn
Hannover University, Germany 817-824

Simulation of Pulverised Coal Combustion in a Blast Furnace
F. C. Lockwood, K. Takeda, and M. Yehia
Imperial College of Science, Technology and Medicine, UK 825-840

Flamelet Modeling and Raman /Rayleigh/ Lipf Measurements of the Structure of Premixed Methane-Air Flames
M. M. M. Abou-Ellail, K. R. Beshay, and M. S. Mansour
Cairo University, Egypt 841-856

Electroconvection and Heat Transfer in Liquid Dielectrics
A. I. Zhakin, and A. A. Tropina
Kharkiv State University, Ukraine 857-661

Session S-22: Aerodynamics **863**

Thursday, January 5, 1995

Chairs: O. El-Bahar, A. Zebib

Leading-Edge Vortices on a Pitching Delta Wing
R. Atta, and D. Rockwell
Minia University, Egypt 863-878

Cold Flow Study of Flame Stabilizing Parameters of Bluff Bodies
M. A. Nouseir, A. M. El-Baz, K. S. Kaddah, and M. A. Selim
Ain Shams University, Egypt 879-892

Aerodynamics Research on Transonic and Small Aspect Ratio Turbines
S. H. Moustapha
Pratt & Whitney, Canada 893-906

Effect of Bleed Slot Location and Angle on Shock Wave Turbulent Boundary Layer Interactions
A. Hamed, J. J. Yeuan, and S. H. Shih
University of Cincinnati, USA 907-914

Estimation of the Maximum Tangential Velocity and Flow Pattern of Gas Flow in the Geometrically Similarity Types of the Axial Flow Vortex Chambers

A. Ogawa, K. Nagasaki, and K. Sugiyama
Nihon University, Japan

915-924

Session S-23: Convection

925

Thursday, January 5, 1995

Chairs: F. M. El-Mehalawy, E. E. Khalil

Experimental Studies of Free Convective Heat Transfer from Fin Arrays using Differential Interferometry

M. A. Abolfadl

Cairo University, Egypt

925-943

Heat Transfer to a Horizontal Tube Bundle Located in the Freeboard of a Bubbling Fluidized Bed Combustor

A. H. Abdel-Hafez, F. M. El-Mahallawy, S. G. Sharobeem, and Z. S. Safar

Cairo University, Egypt

945-957

Heat Transfer Characteristics of a Stretched Surface with Suction or Injection

M. E. Ali

King Saud University, Saudi Arabia

959-971

Numerical Analysis of Vertical Finite Channel Conjugate Natural Convection with a Power Law Fluid

V. D. Quang, and D. H. Chung

Hanoi Technical University, Vietnam

973-980

Session S-24: Two-Phase Flows

981

Thursday, January 5, 1995

Chairs: M. Hilal, R. Kamel

Heat Transfer and Pressure Drop for Air-Water Mixtures in an Isoflux Vertical Annulus

M. Khatab, M. El-Sallak, S. M. Morcos, and A. Salama

Cairo University, Egypt

981-993

Flow and Heat Exchange Numerical Modelling for "Gas-Solid Particles" Two-Phase Media under Counter Flow Conditions

A. V. Borodulin, V. K. Khrutsh, and A. G. Shevelev

Dniepropetrovsk University, Ukraine

995-1004

Calculations of Turbulent Two-Phase Parabolic Flows: Lagrangian Approach Versus Eulerian Approach

M. Khalafallah, A. Mostafa, M. Rizk, and S. El-Sherife

Cairo University, Egypt

1005-1018

Session S-25: Measurements Techniques **1019**

Thursday, January 5, 1995

Chairs: M. F. El-Refae, A. H. Beghdady

[A Flow Visualization Technique using Digital Image Processing](#)

S. M. El-Haggar, and K. M. ElSherbini

The American University, Cairo, Egypt

1019-1030

[Experimental Identification of the Dynamic Characteristics of Externally Pressurized Conical Bearing](#)

M. F. Khalil, K. A. Elshorbagy, S. Z. Kassab, and A. A. Abdel Naby

Alexandria University, Egypt

1031-1052

[The Measurement of Mass Flow Rate using Orifice Plate Meters under Pulsating Conditions](#)

E. Tamura, and J. Iwamoto

Tokyo Denki University, Japan

1053-1062

[Concentration and Velocity Measurements by Applying Hot-Wire and Piezoresistive Techniques](#)

Y. Era, and A. Muramatsu

Nihon University, Japan

1063-1072

[Experimental Studies on Spectroscopic Diagnosis Method for Arc Plasma Jet - Part 1: Argon Jet](#)

L. H. Han, B. Yue, and F. R. Yang

China Aerodynamics Research and Development Center, China

1073-1079

Session S-26: Industrial Applications **1081**

Thursday, January 5, 1995

Chairs: M. A. Fouad, S. H. Mostapha

[Dynamic Performance of Hydrostatic Conical Bearings with Rotation](#)

M. F. Khalil, K. A. Elshorbagy, S. Z. Kassab, and A. A. Abdel Naby

Alexandria University, Egypt

1081-1106

[Characteristics of a Controlled Flow Field by Leading Edge Suction](#)

M. H. Metwally, and M. A. Elsharnoby

Military Technical College - Benha Higher Institute of Technology, Egypt

1107-1121

[On the Modeling of Abrasive Waterjet Cutting](#)

A. A. El-Domiaty, M. A. Shabara, A. A. Abdel-Rahman, and A. K. Al-Sabeeh

Kuwait University, Kuwait

1123-1147

[Experimental Investigation of the Ventilation Network for a 135 MW Air-Cooled Generator](#)

T. T. Al-Shemmeri, and N. R. Weavill

Staffordshire University, UK

1149-1157

Simulation of Poppet Valve Flow Characteristics
S. B. Chin, D. Broadhurst, and W. A. Bullough
University of Sheffield, UK 1159-1168

Flow Field Characteristics of Circular Swirl Jet Generated by Vortex
Generating Jets
N. H. Mostafa, O. K. Rediniotis, and U. Vandsburger
Virginia Polytechnic Institute and State University, USA 1169-1182

Session S-27: Special Topics I 1183

Thursday, January 5, 1995

Chairs: Th. Abou-Arab, A. Cavaliere

Modeling and Simulation of Solar Chimney
A. S. Sabry
Cairo University, Egypt 1183-1195

Dynamic Stiffness and Damping Characteristics of Compensated Hydrostatic
Conical Bearings
M. F. Khalil, K. A. Elshorbagy, S. Z. Kassab, and A. A. Abdel Naby
Alexandria University, Egypt 1197-1229

Blood Flow Simulation across the Ring of Bjork-Shiley Cardiac Valve
M. Bentercia, K. Zidani, A. Cheurfi, K. Belkhiri, and K. Affeld
University of Batna, Algeria - Freie Universitat Berlin, Germany 1231-1240

Mass Transfer into a Liquid Film Flowing Concurrently with High Speed Gas
Flow
T. Fukano, Y. Kinoue, and K. Ishibashi
Kyushu University, Japan 1241-1250

Simulation Study for Microrobots Imitating Flagellar Motion of Organisms in
Fluid
S. Kobayashi, H. Morikawa, and M. Ikeya
Shinshu University, Japan 1251-1260

Session S-28: Special Topics II 1261

Thursday, January 5, 1995

Chairs: Th. E-Hew, A. Ghoneim

Experimental Investigation of the Effect of Polymer Injection on Drag
Reduction
S. Zanoon, M. Rizk, E. Elsherbeeney, and A. Mobarak
Cairo University, Egypt 1261-1276

Wave Processes in Magnetic Fluids with Transformed Microstructure
N. F. Patsegon

Kharkiv State University, Ukraine	1277-1286
The Motion of a Continuum with Sources of Mass Impulse and Energy Continuously Distributed	
<i>I. E. Tarapov</i>	
Kharkiv State University, Ukraine	1287-1295
Characteristics of the Near Wake of Airfoil Sections	
<i>M. S. Mohamed, M. A. Rayan, and S. G. El-Sarraf</i>	
Mansoura University, Egypt	1297-1322
Measurement of Interfacial Area Concentration in Subcooled Liquid-Vapour Flow	
<i>O. Zeitoun, M. Shoukri, and V. Chatoorgoon</i>	
McMaster University, Canada	1323-1358
Variation of the Corner Recirculation Zone in Sudden Enlargement Square Duct with Normal Single Jet	
<i>A. Abdel-Fattah, M. M. El-Mayit, and A. R. Dyab</i>	
Menoufia University, Egypt	1359-1370