# Table of Contents

## Plenary Lectures

*Dynamic stability under sudden loads.*  
G.J. Simitses ................................................................. 1

## Aerospace Applications

*Suppression of large span wings flutter by automatic pilot.*  
R. Cohen, R. Zickel and O. Yehezkely ........................................ 4

*Vibration survey of internal combustion engines for use on unmanned air vehicles.*  
B. Duanis ................................................................. 8

*On stability of viscoelastic elements of thin-shelled constructions under aerohydrodynamic action.*  
P.A. Velmisov and A.V. Ankilov ........................................ 12

*Jet deflection angles in military, civil and RPV thrust vectoring aircraft.*  
V. Sherbaum and M. Lichtsinder ........................................ 15

## Automotive Engineering

*Measurement of pollutant emissions from passenger cars in Israel.*  
M. Gutman, L. Tartakovsky, Y. Zvirin, E. Golgotiu, Y. Aleinikov, A. Serry and N. Vescio ...... 18

*General concept of a gas engine for a hybrid vehicle, operating on methanol dissociation products.*  
L. Tartakovski, Y. Aleinikov, V. Fainberg, A. Garbar, M. Gutman, G. Hetsroni, Y. Shindler, and Y. Zvirin ................................................................. 21

*Catalytic methanol dissociation.*  
Y. Aleinikov, V. Fainberg, A. Garbar, M. Gutman, G. Hetsroni, Y. Shindler, L. Tartakovski, and Y. Zvirin ................................................................. 24

## Biomechanics

*Integrating computer aided radiography and plantar pressure measurements for complex gait analysis.*  
A. Gefen, M. Megido-Ravid, Y. Itzchak and M. Arcan ........................ 27

*The critical biophysical synchronization effect (CBSE) model: Modelling body-brain-mind effects.*  
Y. Naisberg ................................................................. 31

*Experimental Cryosurgery on a Sheep Breast Model Utilizing a New Compact Cryosurgical Device and Miniaturized Cryoprobes.*  
Y. Rabin, T.B. Julian, P. Olson, M.J. Taylor and N. Wolmark .......................... 36

*Analysis of thermal stress in phase-change processes and its application to cryosurgery.*  
Y. Rabin and P.S. Steif ................................................................. 39

*Long-term prediction of force in paralyzed muscle under electrical stimulation: A biomechanical model.*  
O. Levin and J. Mizrahi ................................................................. 40

*Modelling of the interior members of the human body using the robotics conventions.*  
D. Dragulescu, M. Toth-Tascau, C. Puscas and C. Indrei ................................................................. 43

## CAD

*On solving variational geometry by auxiliary constructions.*  
H. Lipson, M. Shpitalni and F. Kimura ................................................................. 46

*Layered manufacturing from multi-level models.*  
A. Fischer and S. Azernikov ................................................................. 50
Topology optimization: A practical approach.
Z. Ashkenazi, P. Bangarpet and D. Marjadi ........................................ 53

Data modelling with fast kernel regression.
J.R. Wolberg .......................................................... 56

Possibilities of using a CAD system in computer-aided assembly of modular fixtures for machining prismatic parts.
L. Segal and C. Romanescu ........................................... 59

Graphic interface for select and assembly of modular fixtures.
L. Segal and C. Romanescu ........................................... 62

Civil Structures

Elevator systems under earthquake excitations — An analytical evaluation of safety provisions.
R. Levy, A. Rutenberg, P. Magnus, E. Marianchik and F. Segal .................. 65

Exact stiffness matrix for high order beam theory.
M. Eisenberger ......................................................... 68

Retrofitting and rehabilitation of concrete structures with composite materials — State of the art.
O. Rabinovich and Y. Frostig ......................................... 71

Combustion & Engines

Organic lining materials test in flue gas ducts.
R. Raveh, D. Sfez, and L. Johansson .................................. 75

Optimal design of emission control systems for a fossil power plant.
D. Sfez, A. Muginstein and Y. Naveh .................................. 78

Steam power plants repowering with gas turbines — Review.
A. Muginstein, Y. Naveh and C. Brenner ................................ 81

Reduction of NO_x emission in tangential fired furnace by changing the mode of operation.
B. Chudnovsky, A. Talanker, L. Levin and S. Kahana ....................... 84

Vibration analysis of an internal combustion engine.
J. Ben-Ari, E. Sher, R. Itzhaki and G. deBotton .......................... 87

A new concept for driving the air conditioning system of an electric bus.
M. Gutman, Y. Zvirin and L. Tartakovsky ................................ 90

Civil vs. military thrust vectoring technologies.
E. A. Wilson, D. Adler, B. Z. Gal-Or, V. Sherbaum and M. Lichtsinder .... 93

Heat of combustion, sound speed and component fluctuations in natural gases.
L. Burststein and D. Ingman ........................................ 96

Spark ignition of swirling ultra-lean methane-air mixtures.
B. Rivin, M. Dulger and E. Sher ....................................... 99

Bi-modal drop-size distribution behavior in plain-jet airblast-atomizer sprays.
R. Harari and E. Sher ............................................... 102

Composite Materials

Optimal design of a curved composite beam with zero thermal expansion.
Z. Miller and S. Ryvkin .............................................. 105

The post-buckling response of a bi-laterally constrained column.
H. Chai ............................................................ 108
Helicoidal inclusion in an elastic matrix.
L.I. Slepyan, V.I. Krylov and R. Parnes ........................................ 111

Measurements of interface fracture properties of composite materials.
D. Ashkenazi, I. Banks-Sills, N. Travizky and R. Eliasi .......................... 114

The effect of stitching on interlaminar fracture toughness characteristics of thick fabric composite laminates.
O. Ishai .................................................................................. 117

Modeling of thermal explosion under pressure in metal ceramic systems.
M. Shapiro, V. Dudko, B. Skachek, A. Matvienko, I. Gotman and E. Gutmanas .......... 120

Design and development of a graphite/epoxy feeline for use in cryogenic propulsion systems.
J.S. Kremer, J.H. Kreiner and A. S. Mosallam ....................................... 124

Propagation of elastic waves and vibrations through composite solids and structures.
M.V. Ayzenberg-Stepanenko ........................................................ 130

Computational Mechanics

Numerical investigation of bifurcating convective flows in long horizontal cavities.

C. Bailey, M. Cross and K. Pericleous .............................................. 136

Implementation of the finite difference differential analysis for the validation of a computational fluid dynamic model
P. Aude, C. Beghein, C. Ménézo and P. Depecker ................................. 139

Towards an expert system for dynamic analysis of printed wiring boards.
I. Ohayon and P. Bar-Yoseph ...................................................... 142

Axisymmetric thrust-vectoring nozzle performance prediction.
E. A. Wilson, D. Adler and P. Bar-Yoseph ......................................... 145

Numerical and spectral investigations of novel infinite elements.
P. Barai, I. Harari, and P.E. Barbone ............................................. 148

Control

Robust stability analysis for uncertain sampled-data control systems.
H.L. Jin, Z.J. Palmor and L. Mirkin .................................................. 151

Multi-rate $H^2$ tracking control with mixed continuous-discrete performance criteria.
A. C. Kahane, Z.J. Palmor and L. Mirkin ......................................... 154

Parametric control of structural vibrations and sound radiation by fast time-space variation of distributed stiffness parameters.
V.I. Krylov and S.V. Sorokin ........................................................ 157

Ground qualification tests of flight control systems for use in civil aircrafts.
J. Postolsky ............................................................................ 160

Engine-inlet ram drag and engine gyroscopic effects elimination by thrust-vectoring flight control during post-stall maneuvers.
M. Lichtsinder and V. Sherbaum .................................................... 163

The model of an electro-hydraulic servo drive.
C. Pal, S. Dumbrava, I. Olah and C.R. Racocea ................................. 166
# Damage & Failure

*Propagation of a plane crack with unregular boundary.*  
D. Ingman and J. Suzdalnitsky ........................................ 169

*Engineering problems of penetration: Advancements at the Institute for Industrial Mathematics.*  
A. Pridor, L. Slepyan, M.V. Ayzenberg-Stepanenko and Yu. Shtemler ........................................ 172

*Stretching and penetration of perturbed jets.*  
A. Lindenfeld, M. Mayseless and J. Falcovitz ........................................ 175

*Penetration of fast rods and jets into finite thickness targets of various densities.*  
M. Mayseless .................................................................. 178

*3-D stress intensity factors resulting from autofrettage for semi-elliptical radial inner cracks in a pressurized cylinder.*  
M. Perl and A. Nachum ........................................ 181

*On the research of the materials corrosion stability.*  
A. Bolotnikov ........................................ 184

## Diamond Industry, The

*Error investigation in CMM measuring of surface revolution.*  
N. Ozdor, Y. Shneor, and E. Abramov ........................................ 187

*Dynamics and forces measurement in diamond turning.*  
Y. Shneor, N. Ozdor, S. Perry, and E. Abramov ........................................ 190

## Dynamics & Vibration

*Use of empirical models in the prediction of acoustic noise and vibration induced by turbulent flow.*  
Z. Sherf and P. Hopstone ........................................ 193

*Safe dynamic stability for high speed ball bearings assemblies.*  
G.D. Hagiu, M.D. Gafitanu, M. Tiron and F. Tudose ........................................ 196

*On the balancing of one type of rotors.*  
A. Bolotnikov ........................................ 199

*Finite elements for nonlinear spatio-temporal dynamics of a twisted helicopter blade.*  
I. Ravve, Y. Kligerman and P. Bar-Yoseph ........................................ 201

*Flow-induced vibrations in a steam blow-out line of a power plant.*  
O. Gottlieb and M. Zabanovitch ........................................ 204

*A new method for constraint violation suppression.*  
S. Djerassi and K. W. Buffinton ........................................ 207

*A novel approach for designing vibration isolation systems.*  
Y. Yadykin and D. Levin ........................................ 211

*The dynamics of an axially moving belt — wave phenomena.*  
Z. Glikman and I. Porat ........................................ 215

*On partial derivatives of repeated eigenvalues and their eigenvectors.*  
U. Prells and M.I. Friswell ........................................ 218

*Application of the variable projection method to estimate a foundation model of a rotary machine using response data due to unknown unbalances.*  
U. Prells ........................................ 221

*Optimizing technology-oriented constructional parameters of complex dynamic systems.*  
S. Novak ........................................ 224
Contributions about the prevision, simulation and optimisation of vibrations transmissibility through mechanical systems.
C. Mohora and C. Ispas ................................................................. 227

Electronic Packaging

Thermal analysis of ADSL communication modem.
Y. Schwartz .................................................................................. 230

LITENING: Packaging consideration and development.
M. Zimmerman ............................................................................. 233

Environmental control system — ECS for LITENING POD.
Z. Shavit ......................................................................................... 236

Engineering Education

Introduction to robotics and real time control — An optional course for general high schools.
I. M. Verner, S. Waks and E. Kolberg ........................................ 241

Student modeling in pen based tutors for engineering problem solving.
A. Tolmacheva .............................................................................. 244

Innovative teaching of conceptual engineering design.
M.P. Weiss and A. Hari ................................................................. 246

Learning robotics and machine vision principles with RobGame.
M. Eliahu ....................................................................................... 249

Teaching CIM: Gap between the education process and the real engineering world.
B.-Z. Sandler and V. Livshits .......................................................... 251

Self-evaluation as a means of problem solving process improvement.
E. Shiyanova .................................................................................. 254

Environmental Protection

Power characteristics and control of the groups of mechanical aerators in an open channel.
M. Tarshish, J. Sack, R. Arviv and A. Aharoni .............................. 257

Utilization of waste polymers through combined pyrolysis with oil shales. One-stage low-temperature pyrolysis.
J. Gersten, V. Fainberg, A. Garbar, G. Hetsroni, and Y. Shindler 260

Micro bubbles generator for water treatment by flotation and absorption.
I. Borde, T. Elperin, A. Fominykh, M. Jelinek and M. Vaisman 263

Israel electric corporation experience with SO3 flue gas conditioning for electrostatic precipitator performance improvement.
A. Muginstein, Y. Naveh and D. Sfez ........................................... 266

Extent and causes of site impacts due to trafficking by forest harvesting machinery.
D. Wulfsohn .................................................................................. 269

Recycling swarf after grinding operations.
A. V. Sverdlin 2 ............................................................................ 272

Fluid Mechanics

On linear and nonlinear stability of coaxial pipe flow.
I. Shapiro, L. Shtilman and A. Tumin ........................................... 275

The motion of a deformable body in bounded fluid.
A.R. Galper and T. Miloh ............................................................. 278
Possible and impossible solutions of the Navier-Stokes equations.
S. Irmay ........................................... 281

On dissipative effects in chemical flooding.
D.V. Voskov, V.M. Entov and O.V. Galamay ........................ 284

Acoustic levitation of droplets: A new technological and research tool.
A.L. Yarin ........................................ 287

Formation number of laminar vortex rings: Numerical simulations.
M. Rosenfeld, E. Rambod and M. Gharib .......................... 289

Two-phase phenomenon in wet flue gas desulfurization processes.
U. Minzer, E.J. Moses, M. Toren and Y. Blumenfeld .............. 292

On the distinction between droplets of low arrival frequencies (LAF) and high arrival frequencies (HAF) in the mathematical representation of polydisperse sprays.
Y. Tambour ........................................ 295

Transport properties of viscous vortex rings.
F. Kaplanski and Ü. Rudi .................................. 298

Navier-Stokes analyses of the supersonic ejector.
A. Shklyar, A. Arbel and M. Sokolov ............................. 301

Evaluation of gas-nozzle parameters for explosive atomization of a liquid jet.
Y.M. Shtemler, M.P. Levitsky, I.R. Shreiber and S.P. Levitsky ...... 304

A PML technique for FEM acoustic computation.
M. Slavutin, I. Harari and E. Turkel ............................ 307

Modeling of charging and discharging of pressure vessels with ideal gas.
B.-Z. Maytal, and R. Eshel .................................. 310

Stability of axisymmetric convective flows with respect to three-dimensional perturbations.

Image processing for characterization of turbulent flow in a flume.
G. Abramovich, M. Zacksenhouse and G. Hetsroni .................. 318

Analytical calculation of volume and centroid coordinates of 'liquid body' placed in tilting conical/cylindrical vessel.
L.A. Demyanets ........................................ 321

Evolution equation for waves forced by a thin obstacle in a two-layer fluid.
I. Seleozov, P. Huq, M. Mironchuk and R. Volynski ................ 325

3D modeling of water waves in an open reservoir.
M. Toren and E. J. Moses ................................... 327

3D modeling of flow in the diffuser of a gas turbine.
E. J. Moses ........................................ 330

Investigation of cross-flow model water turbine.
V. Obretenov .......................................... 333

Granular Materials

The friction coefficient of powder material and separation process.
B. Eiderman and O. Levy .................................... 336

Stress distribution in sand piles — A variation approach.
T. Elperin and A. Vikhansky .................................. 338
Hydrodynamics of rapid granular flow of inelastic particles into vacuum.
V. Kamenetsky, A. Potapov, A. Goldshtein, M. Shapiro, D. Degani, and C. Campbell .................. 341

Flow measurement and attrition of particulate materials at various bends during pneumatic conveying.
K. Aked and H. Kalman ............................................................................................................. 344

The segregation of granular materials within a silo — preliminary analysis.
Z. Greidingher, H. Kalman and D. Goder .................................................................................. 347

The applications of en-masse conveyors with bulk solids handling.
Z. Greidingher ........................................................................................................................ 350

Selective pulverizing of minerals.
E. Grant ........................................................................................................................................ 351

Fatigue characteristics of particles.
D. Goder and H. Kalman .......................................................................................................... 353

Some results of investigation of solid particles distribution in the vicinity of various shapes in two-phase flow and sedimentation on their surfaces.
M. Hussainov, A. Karkushinsky, I. Shcheglov and S. Tisler ..................................................... 356

Heat Transfer

Enhancement of heat transfer by means of corona wind between wire electrode and horizontal plate.
H. Kalman and E. Sher .............................................................................................................. 359

Analysis of composed fin arrays.
O. Braunshtein and H. Kalman ................................................................................................... 362

Solution of Berger's equation by eigenfunction expansions.
S. Olek ......................................................................................................................................... 365

Flow and heat transfer in cooling microchannels with phase-change.
Y.P. Peles, L.P. Yarin and G. Hetsroni ...................................................................................... 368

Structure of temperature field on a wall in turbulent flow (statistics of thermal streaks, heat transfer)
G. Hetsroni, A. Mosyak, R. Rozenblit and L.P. Yarin ............................................................... 371

Exchange of energy between a moving blade and a liquid.
S. Yedidiah .................................................................................................................................. 374

Analysis of heat and mass transfer between a wet fin and a moist air flow.
B. Abramzon ................................................................................................................................ 378

A numerical model of Marangoni convection in a static absorber in the presence of surfactant additives.
M. Koenig and G. Grossman ...................................................................................................... 383

Fast cooldown Joule-Thompson cryocooling for infrared detectors.
B.-Z. Maytal ............................................................................................................................. 387

Quenching of hot oxidizing surfaces.
A. Davidy, E. Elias and S. Olek .................................................................................................... 391

A numerical simulation method for radiative transport in general participating media.
R. Ben-Zvi, A. Fiterman and A. Kribus ...................................................................................... 394

Solution treatment of aluminum alloys in the aerodynamic heating furnaces
A. V. Sverdlin and A. R. Ness .................................................................................................... 397

Thermodynamical approach for the determination of the speed of heat propagation in heat conduction.
I. Shnaid ....................................................................................................................................... 401

Computer aided heat transfer analysis in a laboratory scaled heat exchanger unit.
M. Günes ...................................................................................................................................... 404
Low temperature liquid bath nitriding of steels.
A. I. Finkelstein, L. Finkelstein and E. Eliyahu ........................................ 407

Innovations in Industry

Managing knowledge and innovation in Israeli Industries.
D. Vekstein ................................................................. 410

Next generation manufacturing.
K. Preiss ................................................................. 413

Intellectual property: The business leverage for hi-tec companies.
Y. Amir ................................................................. 416

Manufacturing

Placement of fine-pitch surface-mounted components: An assembly application of molded-interconnect-devices.
Z. Fainberg and E. Zussman ............................................... 418

A consistent approach to PDM implementation.
Y. Reich, S. L. Konda and E. Subrahmanian .................................. 421

S. V. Barai and Y. Reich .................................................. 424

Rozenblat’s new cutting tools for manufacturing processes.
A.I. Rozenblat ............................................................. 427

Superplastic forming of commercial aircraft components.
M. Noy, B. Gershon, L. Kogan and I. Eldror .................................. 433

Some applications of rubber punch.
M. Noy, B. Gershon and L. Kogan ........................................ 436

High performance drilling — Drill and clamping unit behavior.
J. Rotberg, M. Levin and E. Lenz ........................................ 439

Adaptive disassembly process planning utilizing kernel regression.
N. Salomonski and E. Zussman ........................................... 443

Improvement of profitability and quality in mechanical engineering in Israel.
I. Lopatukhin and M. Lopatukhin ........................................ 447

The phenomenon of the rapid transverse auto-oscillations at the holes processing using the multi-blade rotating instruments and the effects of the errors formation relating to this.
Y. Khilkevich ............................................................. 450

The calculation of the plain and space dimensional chains by interval analysis methods.
Y. Khilkevich ............................................................. 453

Optimisation of industrial manufacturing products by simulation.
C. Ispas, C. Mohora and O. Calin ........................................ 454

Mastery of the violincello bow as particular case of manipulating by the tools of labour.
V. Gorfinkel ............................................................. 457

Modeling of the thin milling in planetary mills.
A. Dubensky, S. Potyomkina and S. Leonov ................................ 461

Mechanisms & Devices

Facial toothed joints and gearings.
G. Raikhman ............................................................. 463
A geared four-bar linkage for mechatronic applications.
L. Beiner .................................................. 470

Rigid 6 x 6 parallel platform for precision 3-D micromanipulation: Experimental Investigation.
V.T. Portman and B.-Z. Sandler ........................................ 473

The Russian inventor and scientist brings the new technologies to USA.
A.I. Rozenblat .................................................. 476

Bionic bearing.
Y. Surpin .................................................. 483

Morphological analysis application in strain measuring dynameters: review and searching for their structures.
P. Giverts .................................................. 485

High performance casing threaded joint.

Precision of the strain gage performances: Optimization possibilities.
P.-D. Barsanescu and F. Mocanu .................................................. 492

A telemetrical contactless system for measurement of torque and power on rotating shafts.
V. Dudko, A. Arda and M. Shapiro .................................................. 495

New technological scheme for washing glass and polymeric packages for multiple use.
N. Markova, S. Vassilev, S. Stefanov and D. Tanev .................................................. 497

Specific aspects of calculation and experimental tests of radial bearings with both mobile races.
C.R. Racocea, L. Hostiuc, C.C Racocea and C. Pal .................................................. 499

Naval Architecture and Ocean Engineering

Modifications to the Michell integral for improved prediction of ship resistance.
L.J. Doctors .................................................. 502

Experiences in identification and control of a ROV.
M. Caccia, A. Tiano, G. Veruggio .................................................. 507

Recent developments in marine systems control.
A. Tiano, A. Biran and P.O. Gutman .................................................. 510

Design of shell plates minimizing the heat input.
T. Randrup and N. Basu .................................................. 513

Getting correctly shaped spline curves and surfaces from inaccurate input points.
E. Kantorowitz and R. Drabkin .................................................. 516

Off-Road Vehicles

Active control for single wheel station of off-road track vehicle.
A. Liberzon, D. Rubinstein and P.O. Gutman .................................................. 520

Comparison between two tracked vehicle simulation programs (REKEM and DADS).
D. Rubinstein .................................................. 525

Modelling specific volume and water retention of shrinkage cracks.
V.Y. Chertkov and I. Ravina .................................................. 529

Modelling tortuosity of the water filled part of a crack network in swelling soils.
V.Y. Chertkov and I. Ravina .................................................. 532
Opto-mechanics

An innovative solution for a shock problem in optomechanical systems.
N. Shcheranski and D. Wormser ........................................ 535

A liquid crystal thermal switch for diode pumped lasers.
D. Slasky ........................................................................... 538

Silicon carbide as new material for micro-optical components.
B. Brill, R. Oron and M. Oron ........................................... 541

Reliability

Diagnosis of heat exchanger tube failure in fossil fuel boilers through estimation of steady state operating conditions.
A. Herszage and M. Toren .................................................. 544

Service life of main piping component due to low fatigue thermal stresses.
R. Miroshnik, A. Jeager and H. Ben Haim ........................... 547

Evaluating the statistics, accumulated damage and reliability of a mechanical system exposed to random vibration or acoustic noise.
Z. Sherf and P. Hopstone .................................................. 550

Influence of inspection intervals on mechanical system reliability.
B. Zilberman ...................................................................... 553

Principles of data-fusion in multi-sensor systems for non-destructive testing.
S. Chioclea and P. Dickstein .............................................. 556

Evaluation of alternative redundancy designs.
D. Perlstein, R. Plotin and Z. Benyamini .............................. 558

Uncertainty aversion and design decisions.
Y. Ben-Haim ....................................................................... 561

Hybrid robust and probabilistic reliability of structures.
Y. Ben-Haim ....................................................................... 563

Robotics

Dynamics of a six-degrees-of-freedom parallel robot actuated by three carts.
P. Dombiak, S. Djerassi, M. Shoham and R. Ben-Horin .......... 566

Robomow by Friendly Machines: The first commercial fully automatic and systematic lawn mower.
U. Peless ........................................................................... 570

Dynamic controller for an autonomous guided vehicle.
M. Abramovitch, S. Djerassi and J. Dayan ............................ 572

Construction of an anthropomorphic robot teaching system.
M. Dvorjetski, E. Levi, N. Asor and M. Zacksenhouse ........... 577

3-D evaluation of robot repeatability.
R. Riemer and Y. Edan ...................................................... 580

A supervisory control system for an autonomous dirt road vehicle.
O. Cohen and Y. Edan ...................................................... 583

Solar Energy

Secondary concentrator for a commercial solar receiver system — Design and evaluation.
**Power plant with CO₂-capture and solar energy conversion in microalgae mass culture.**
G. Borodyansky, E. Yantovski, and L. Levin ...................................................... 589

**Solid Mechanics**

*Physical restrictions on the impulse acting during three-dimensional impact of two “rigid” bodies.*
M.B. Rubin ................................................................. 592

*On torsion of closed thin-wall members with arbitrary stress-strain laws which exhibit no warping.*
A. Chiskis and R. Parnes .............................................. 595

*General theory of reinforced shells. Stress-strain state of reinforced cylindrical shells under static loading.*
V. Zarutsky ............................................................... 598

*Experimental and theoretical study of stability of ribbed cylindrical shells.*
V. Zarutsky ............................................................... 601

*Constitutive equations in finite viscoelastoplasticity of polymers.*
A. D. Drozdov .................................................................. 604

*Feature of elastically supported semi-infinite cylindrical shell loaded at the end face.*
I. Lopatuhkhn and A. Ber .............................................. 607

*Elasticity based approach to the buckling of reinforced solids.*
G. deBotton ................................................................. 613

*Waterdrops impacts on coated targets.*
G. deBotton, A. Telias and G. Cibulski .......................... 616

*Lateral X-tension, self-induced under uniaxial compression in brittle solids: The model.*
I. Blechman ................................................................. 619

*Space-time spectral elements for dynamic analysis of plates based upon Reissner-Mindlin theory.*
Y. Kligerman, I. Ravve and P.Z. Bar-Yoseph .................. 620

*Strength evaluation of single lap joints bonded with an epoxide adhesive.*
B. Mocanu and P.-D. Barsanescu .................................. 623

*On the microalloying of sintered steels for structural parts.*
M. Orban and A. Palfalvi .............................................. 626

**State of the Art: Keynotes**

*Continuum models with reversible microstructure.*
A.I. Leonov .................................................................. 629

*Fluid dynamics and mass transfer in two-fluid Taylor-Couette flow.*
G. Baier and M.D. Graham ............................................ 632

*Micromechanics — Challenges in an emerging technology.*
S. Kaldor and D. Seter .................................................. 635

**Technology & Society**

*The engineers of divine providence: How theology united practical experience with the search for truth.*
M. Ben-Chaim ............................................................ 638

*‘When do you expect me to launch, next April?’ How engineering education contributed to the failure of the space shuttle Challenger.*
Sel Eisen ...................................................................... 641

**Tribology**

*Influence of residual stresses on abrasive wear resistance of steels.*
I.I. Garbar .................................................................. 647
Experimental investigation of tribological properties of hard Ni Cr B Si laser cladding.
G. Ryk, I. Etsion and M. Bamberger ................................................................. 650

A new method to predict the fatigue behaviour of thin hard coatings. Applications in the RCF test and in hybrid bearings used in high speed machine tools spindles.
K.-D. Bouzakis, N. Vidakis and S. Mitsi ............................................................... 653

An evaluation of adhesion strength of vacuum arc deposited Nb-N coatings by scratch testing.

Tribology effects on electrical contacts in smart cards.
L. Kogut and I. Etsion ......................................................................................... 662

Tribological aspects of thin diamond coatings.
G. Halperin, I. Etsion, O. Glozman and A. Hoffman ........................................... 663

A general view on reconditioned point contact service life versus standard one.
F. Farcas, St. Grigoras and M.C. Tiron ............................................................... 664

Bearings reconditioning when considering the linear contact case.
St. Grigoras, F. Farcas and C. Stirbu .................................................................... 666

Late Arrivals

Matched asymptotics for 3-dimensional planing problems.
G.M. Fridman and N.V. Kornev ........................................................................... 668

Design of a ram air driven reverse bootstrap air cycle for aircraft pods.
A. Erez and B. Davidson ..................................................................................... 671

Explosive actuated systems for civil and military applications.
M. Berenson ........................................................................................................ 674

Experimental investigation of thermal conductivity and diffusivity of chrome-magnesite refractories.
T. Gambaryan-Roisman, V. Dudko, M. Shapiro and A. Shavit ............................... 677

Vibrational motion of one-dimensional set of inelastic granules.
A. Alexeev, A. Goldshtein, O. Gottlieb and M. Shapiro ....................................... 680

Space-time spectral elements and control of a nonlinear beam.
H. Plat, P.Z. Bar-Yoseph and H. Flashner ......................................................... 683

A PZT system for fatigue loading of small ceramic parts.
E. Altus and A. Golubchick ................................................................................. 686

Combined action of thermocapillary and buoyancy instability mechanisms in two-layer systems with anomalous thermocapillary effect.
L.M. Braverman, K. Eckert, A. Holzhey, A.A. Nepomnyaschchy, I.B. Simanovskii and A. Thess 689