

Contents

Part I Order and Chaos

Order and Chaos in Astronomy

George Contopoulos 3

Critical Ergos Curves and Chaos at Corotation

Donald Lynden-Bell, Jaideep M. Barot 30

Stellar Dynamics and Molecular Dynamics: Possible Analogies

Andrea Carati, Luigi Galgani 44

Waves Derived from Galactic Orbits. Solitons and Breathers

Nikos Voglis 56

Discrete Breathers and Homoclinic Dynamics

Tassos Bountis, Jeroen M. Bergamin 75

Chaos or Order in Double Barred Galaxies?

Witold Maciejewski 91

Jeans Solutions for Triaxial Galaxies

Glenn van de Ven, Chris Hunter, Ellen Verolme, Tim de Zeeuw 101

Nonlinear Response of the Interstellar Gas Flow to Galactic Spiral Density Waves

Edward Liverts, Michael Mond 109

The Level of Chaos in N-Body Models of Elliptical Galaxies

*Nikos Voglis, Costas Kalapotharakos, Ioannis Stavropoulos,
Christos Efthymiopoulos* 117

Low Frequency Power Spectra and Classification of Hamiltonian Trajectories

George Voyatzis 126

Part II Orbit Theory

Disk-Crossing Orbits

Chris Hunter 137

**Chaos and Chaotic Phase Mixing in Galaxy Evolution
and Charged Particle Beams**

Henry E. Kandrup 154

Black Hole Motions

Richard H. Miller 169

Weak Homology of Bright Elliptical Galaxies

Giuseppe Bertin 185

Part III Observations

Observing Chaos in Disk Galaxies

Preben Grosbøl 201

**Observational Determination of the Gravitational Potential
and Pattern Speed in Strongly Barred Galaxies**

Per A.B. Lindblad, Per Olof Lindblad 213

**Observational Manifestation of Chaos
in Grand Design Spiral Galaxies**

*Alexei M. Fridman, Roald Z. Sagdeev, Oleg V. Khoruzii,
Eugenii V. Polyachenko* 223

Quarter-Turn Spirals in Galaxies

Eugenii Polyachenko 235

Dynamics of Galaxies:**From Observations to Distribution Functions**

Herwig Dejonghe, Veronique De Bruyne 243

Arp 158: A Study of the HI

*Mansie G. Iyer, Caroline E. Simpson, Stephen T. Gottesman,
Benjamin K. Malphrus* 263

Dark Matter in Spiral Galaxies

Albert Bosma 271

A SAURON View of Galaxies

*Ellen K. Verolme, Michele Cappellari, Glenn van de Ven, P. Tim de Zeeuw,
Roland Bacon, Martin Bureau, Yanick Copin, Roger L. Davies,
Eric Emsellem, Harald Kuntschner, Richard McDermid, Bryan W. Miller,
Reynier F. Peletier* 279

Photometric Properties**of Karachentsev's Mixed Pairs of Galaxies**

*Alfredo Franco-Balderas, Deborah Dultzin-Hacyan,
Héctor M. Hernández-Toledo* 286

Spline Histogram Method for Reconstruction**of Probability Density Functions of Clusters of Galaxies**

Dmitrijs Docenko, Kārlis Bērziņš 294

Stars Close to the Massive Black Hole**at the Center of the Milky Way**

*Nelly Mouawad, Andreas Eckart, Susanne Pfalzner, Christian Straubmeier,
Rainer Spurzem, Reinhard Genzel, Thomas Ott, Rainer Schödel* 302

Part IV Formation and Evolution of Galaxies**Angular Momentum Redistribution****and the Evolution and Morphology of Bars**

Lia Athanassoula 313

Major Mergers and the Origin of Elliptical Galaxies

Andreas Burkert, Thorsten Naab 327

Dynamical Evolution of Galaxies:**Supercomputer *N*-Body Simulations**

Edward Liverts, Evgeny Griv, Michael Gedalin, David Eichler 340

Formation of the Halo Stellar Population**in Spiral and Elliptical Galaxies**

Tetyana Nyktyuk 348

Model of Ejection of Matter from Dense Stellar Cluster**and Chaotic Motion of Gravitating Shells**

*Maxim V. Barkov, Vladimir A. Belinski, Genadii S. Bisnovatyi-Kogan,
Anatoly I. Neishtadt* 357

Direct vs Merger Mechanism Forming Counterrotating Galaxies

Maria Harsoula, Nikos Voglis 365

Pitch Angle of Spiral Galaxies**as Viewed from Global Instabilities of Flat Stellar Disks**

Shunsuke Hozumi 380

Collisionless Evaporation from Cluster Elliptical Galaxies <i>Veruska Muccione, Luca Ciotti</i>	387
---	-----

Part V Solar System Dynamics

Chaos in Solar System Dynamics <i>Rudolf Dvorak</i>	395
---	-----

Dynamics of Extrasolar Planetary Systems: 2/1 Resonant Motion <i>John D. Hadjidemetriou, Dionyssia Psychoyos</i>	412
--	-----

The “Third” Integral in the Restricted Three-Body Problem Revisited <i>Harry Varvoglis, Kleomenis Tsiganis, John D. Hadjidemetriou</i>	433
--	-----