



Universiteit
Leiden
The Netherlands

Chaotic Dynamics in N-body systems

Boekholt, T.C.N.

Citation

Boekholt, T. C. N. (2015, November 10). *Chaotic Dynamics in N-body systems*. Retrieved from <https://hdl.handle.net/1887/36077>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/36077>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/36077> holds various files of this Leiden University dissertation

Author: Boekholt, Tjarda

Title: Chaotic dynamics in N-body systems

Issue Date: 2015-11-10

Bibliography

- Aarseth S. J., 1963, *Monthly Notices of the Royal Astronomical Society*, 126, 223
- Aarseth S. J., 2003, *Gravitational N-Body Simulations*
- Aarseth S. J., Anosova J. P., Orlov V. V., Szebehely V. G., 1994, *Celestial Mechanics and Dynamical Astronomy*, 58, 1
- Aarseth S. J., Henon M., Wielen R., 1974, *Astronomy and Astrophysics*, 37, 183
- Aarseth S. J., Hoyle F., 1964, *Astrophysica Norvegica*, 9, 313
- Aarseth S. J., Lecar M., 1975, *Annual Review of Astronomy and Astrophysics*, 13, 1
- Ahmad A., Cohen L., 1973, *Journal of Computational Physics*, 12, 389
- Babadzhanyants L. K., 1981, *Pisma v Astronomicheskii Zhurnal*, 7, 752
- Barnes J., Hut P., 1986, *Nature*, 324, 446
- Bédorf J., Gaburov E., Fujii M. S., Nitadori K., Ishiyama T., Portegies Zwart S., 2014, *ArXiv e-prints*
- Bédorf J., Portegies Zwart S., 2012, *European Physical Journal Special Topics*, 210, 201
- Binney J., Tremaine S., 1987, *Galactic dynamics*
- Boekholt T., Portegies Zwart S., 2015, *Computational Astrophysics and Cosmology*, 2, 2
- Boekholt T. C. N., McMillan S. L. W., Portegies Zwart S. F., 2015, *In preparation*
- Boltzmann L., 1868, *Wiener Berichte*, p. 517–560
- Bulirsch R., Stoer J., 1964, *Numerische Mathematik*, pp 413–427
- Burrau C., 1913, *Astronomische Nachrichten*, 195, 113
- Caputo D. P., de Vries N., Portegies Zwart S., 2014, *Monthly Notices of the Royal Astronomical Society*, 445, 674
- Chambers J. E., 1999, *Monthly Notices of the Royal Astronomical Society*, 304, 793
- Chandrasekhar S., 1942, *Principles of stellar dynamics*
- Chenciner A., Montgomery R., 2000, *ArXiv Mathematics e-prints*
- Chirikov R. V., Vecheslavov V. V., 1989, *Astronomy and Astrophysics*, 221, 146
- Conway B. A., 1986, *Celestial Mechanics*, 39, 199
- Copernicus N., 1543, *De revolutionibus orbium coelestium*.

- Dejonghe H., Hut P., 1986, in Hut P., McMillan S. L. W., eds, *The Use of Supercomputers in Stellar Dynamics* Vol. 267 of *Lecture Notes in Physics*, Berlin Springer Verlag, Round-Off Sensitivity in the N-Body Problem. p. 212
- Duncan M. J., Levison H. F., Lee M. H., 1998, *Astronomical Journal*, 116, 2067
- Euler L., 1767, *Novi Commentarii academiae scientiarum Petropolitanae*, 11, 103
- Faber N. T., Boily C. M., Portegies Zwart S., 2008, *Monthly Notices of the Royal Astronomical Society*, 386, 425
- Fujii M., Iwasawa M., Funato Y., Makino J., 2007, *Publications of the Astronomical Society of Japan*, 59, 1095
- Galilei G., 1610, *Sidereus Nuncius*.
- Goodman J., Heggie D. C., Hut P., 1993, *Astrophysical Journal*, 415, 715
- Gragg W. B., 1965, *SIAM Journal on Numerical Analysis*, pp 384–403
- Hairer E., Lubich C., Wanner G., 2002, *Geometric numerical integration : structure-preserving algorithms for ordinary differential equations*. Springer series in computational mathematics, Springer, Berlin, Heidelberg, New York
- Halley E., 1705, *Synopsis of the Astronomy of Comets*.
- Hartnett J. G., Luiten A. N., 2011, *Rev. Mod. Phys.*, 83, 1
- Hayes W. B., 2008, *Monthly Notices of the Royal Astronomical Society*, 386, 295
- Heggie D., Hut P., 2003, *The Gravitational Million-Body Problem: A Multidisciplinary Approach to Star Cluster Dynamics*
- Heggie D. C., 1975, *Monthly Notices of the Royal Astronomical Society*, 173, 729
- Heggie D. C., 1991, in Roeser S., Bastian U., eds, *Predictability, Stability, and Chaos in N-Body Dynamical Systems* *Chaos in the N-body problem of stellar dynamics..* pp 47–62
- Heggie D. C., 2000, *Monthly Notices of the Royal Astronomical Society*, 318, L61
- Heggie D. C., 2014, *Monthly Notices of the Royal Astronomical Society*, 445, 3435
- Heggie D. C., Mathieu R. D., 1986, in Hut P., McMillan S. L. W., eds, *The Use of Supercomputers in Stellar Dynamics* Vol. 267 of *Lecture Notes in Physics*, Berlin Springer Verlag, Standardised Units and Time Scales. p. 233
- Hénon M. H., 1971, *apss*, 14, 151
- Hernquist L., Hut P., Makino J., 1993, *Astrophysical Journal Letters*, 402, L85

- Hockney R. W., Eastwood J. W., 1988, Computer simulation using particles
- Hughes D. W., 1985, Monthly Notices of the Royal Astronomical Society, 213, 103
- Hut P., 1983, Astronomical Journal, 88, 1549
- Hut P., 1993, Astrophysical Journal, 403, 256
- Hut P., Bahcall J. N., 1983, Astrophysical Journal, 268, 319
- Hut P., Heggie D. C., 2002, Journal of Statistical Physics, 109, 1017
- Hut P., McMillan S., Goodman J., Mateo M., Phinney E. S., Pryor C., Richer H. B., Verbunt F., Weinberg M., 1992, Publications of the Astronomical Society of the Pacific, 104, 981
- Ito T., Tanikawa K., 2002, Monthly Notices of the Royal Astronomical Society, 336, 483
- Jenkins R. M., 2004, Journal of the British Astronomical Association, 114, 336
- Jílková L., Portegies Zwart S., Pijloo T., Hammer M., 2015, ArXiv e-prints
- Johnstone D., Rucinski S. M., 1991, *pasp*, 103, 359
- Kandrup H. E., 1996, in Jantzen R. T., Mac Keiser G., Ruffini R., eds, Proceedings of the Seventh Marcel Grossman Meeting on recent developments in theoretical and experimental general relativity, gravitation, and relativistic field theories Chaos, regularity, and noise in self-gravitating systems.. pp 167–182
- Kepler J., 1609, *Astronomia Nova*.
- Kinoshita H., Yoshida H., Nakai H., 1991, *Celestial Mechanics and Dynamical Astronomy*, 50, 59
- Kokubo E., Yoshinaga K., Makino J., 1998, Monthly Notices of the Royal Astronomical Society, 297, 1067
- Kolmogorov A., 1933, 1st. *Ital. Attuari. G.*, 4, 1–11
- Lagrange J. L., 1772, *Prix de l'Académie Royale des Sciences de Paris*, 6, 292
- Landgraf W., 1986, *Astronomy and Astrophysics*, 157, 245
- Laskar J., 1989, *Nature*, 338, 237
- Laskar J., 2008, *Icarus*, 196, 1
- Laskar J., Gastineau M., 2009, *Nature*, 459, 817
- Lyapunov A. M., Walker J. A., 1994, *JAM*, 61, 226
- Lyne A. G., 1996, in van Paradijs J., van den Heuvel E. P. J., Kuulkers E., eds, *Compact Stars in Binaries Vol. 165 of IAU Symposium, A Review of Galactic Millisecond Pulsar Searches*. p. 225
- Makino J., 1994, in Gurzadyan V. G., Pfenniger D., eds, *Ergodic Concepts in Stellar Dynamics Vol. 430 of Lecture Notes in Physics*,

- Berlin Springer Verlag, Smoothing of the Cosmic Background Radiation by Multiple Gravitational Scattering. p. 274
- Makino J., Aarseth S. J., 1992, Publications of the Astronomical Society of Japan, 44, 141
- Mardling R. A., 2008, in Vesperini E., Giersz M., Sills A., eds, IAU Symposium Vol. 246 of IAU Symposium, Resonance, Chaos and Stability in the General Three-Body Problem. pp 199–208
- Martínez-Barbosa C. A., Brown A. G. A., Portegies Zwart S., 2015, ArXiv e-prints
- Maxwell J. C., 1867, Phil. Trans. R. Soc. Lond., 157, 49
- McMillan S., Portegies Zwart S., van Elteren A., Whitehead A., 2012, in Capuzzo-Dolcetta R., Limongi M., Tornambè A., eds, Advances in Computational Astrophysics: Methods, Tools, and Outcome Vol. 453 of Astronomical Society of the Pacific Conference Series, Simulations of Dense Stellar Systems with the AMUSE Software Toolkit. p. 129
- McMillan S. L. W., 1986, in Hut P., McMillan S. L. W., eds, The Use of Supercomputers in Stellar Dynamics Vol. 267 of Lecture Notes in Physics, Berlin Springer Verlag, The Vectorization of Small-N Integrators. p. 156
- McMillan S. L. W., Hut P., 1996, Astrophysical Journal, 467, 348
- Mikkola S., Aarseth S., 2002, Celestial Mechanics and Dynamical Astronomy, 84, 343
- Mikkola S., Tanikawa K., 1999a, Monthly Notices of the Royal Astronomical Society, 310, 745
- Mikkola S., Tanikawa K., 1999b, Celestial Mechanics and Dynamical Astronomy, 74, 287
- Miller R. H., 1964, Astrophysical Journal, 140, 250
- Monaghan J. J., 1976, Monthly Notices of the Royal Astronomical Society, 176, 63
- Moore C., 1993, Phys. Rev. Lett., 70, 3675
- Moser J., ed. 1973, Stable and random motions in dynamical systems. With special emphasis on celestial mechanics
- Muñoz-Gutiérrez M. A., Reyes-Ruiz M., Pichardo B., 2015, Monthly Notices of the Royal Astronomical Society, 447, 3775
- Newton I., 1687, Philosophiae Naturalis Principia Mathematica.
- Nyland L., Harris M., Prins J., 2007, in Nguyen H., ed., , GPU Gems 3. Addison Wesley Professional, Chapt. 31
- Papamarinopoulos S. P., Preka-Papadema P., Antonopoulos P., Mitropetrou H., Tsironi A., Mitropetros P., 2013, Mediterranean Archaeology & Archaeometry, 13, 69

- Pelupessy F. I., Jänes J., Portegies Zwart S., 2012, *New Astronomy*, 17, 711
- Plummer H. C., 1911, *Monthly Notices of the Royal Astronomical Society*, 71, 460
- Poisson E., Will C. M., 2014, *Gravity*
- Portegies Zwart S., Bédorf J., 2014, *ArXiv e-prints*
- Portegies Zwart S., Boekholt T., 2014, *Astrophysical Journal Letters*, 785, L3
- Portegies Zwart S., McMillan S., Groen D., Gualandris A., Sipior M., Vermin W., 2008, *New Astronomy*, 13, 285
- Portegies Zwart S., McMillan S., Pelupessy I., van Elteren A., 2012, in Capuzzo-Dolcetta R., Limongi M., Tornambè A., eds, *Advances in Computational Astrophysics: Methods, Tools, and Outcome* Vol. 453 of *Astronomical Society of the Pacific Conference Series*, *Multi-physics Simulations using a Hierarchical Interchangeable Software Interface*. p. 317
- Portegies Zwart S., McMillan S. L. W., van Elteren E., Pelupessy I., de Vries N., 2013, *Computer Physics Communications*, 183, 456
- Portegies Zwart S. F., McMillan S. L. W., Hut P., Makino J., 2001, *Monthly Notices of the Royal Astronomical Society*, 321, 199
- Preto M., Tremaine S., 1999, *Astronomical Journal*, 118, 2532
- Prialnik D., Bar-Nun A., 1992, *Astronomy and Astrophysics*, 258, L9
- Quinlan G. D., Tremaine S., 1992, *Monthly Notices of the Royal Astronomical Society*, 259, 505
- Rollin G., Haag P., Lages J., 2014, *ArXiv e-prints*
- Seargent D. A. J., 2009, *The Greatest Comets in History*
- Shevchenko I. I., 2007, in Valsecchi G. B., Vokrouhlický D., Milani A., eds, *IAU Symposium Vol. 236 of IAU Symposium*, *On the Lyapunov exponents of the asteroidal motion subject to resonances and encounters*. pp 15–30
- Shimada M., Yoshida H., 1996, *Publications of the Astronomical Society of Japan*, 48, 147
- Simon L., 1986, *La Recherche*, 17, 854
- Smirnov N., 1948, *The Annals of Mathematical Statistics*, 19, 279
- Smith Jr. H., 1979, *Astronomy and Astrophysics*, 76, 192
- Spitzer L., 1987, *Dynamical evolution of globular clusters*
- Sussman G. J., Wisdom J., 1992, *Science*, 257, 56
- Szebehely V., 1972, *Proceedings of the National Academy of Science*, 69, 1077
- Szebehely V., Peters C. F., 1967, *Astronomical Journal*, 72, 876
- Tanikawa A., Hut P., Makino J., 2012, *New Astronomy*, 17, 272

- Urminsky D., 2008, in Vesperini E., Giersz M., Sills A., eds, IAU Symposium Vol. 246 of IAU Symposium, On the Calculation of Average Lifetimes for the 3-body Problem. pp 235–236
- Urminsky D. J., 2010, Monthly Notices of the Royal Astronomical Society, 407, 804
- Urminsky D. J., Heggie D. C., 2009, Monthly Notices of the Royal Astronomical Society, 392, 1051
- Valtonen M., Karttunen H., 2006, The Three-Body Problem
- Valtonen M., Mylläri A., Orlov V., Rubinov A., 2004, in Byrd G. G., Kholshevnikov K. V., Mylläri A. A., Nikiforov I. I., Orlov V. V., eds, Order and Chaos in Stellar and Planetary Systems Vol. 316 of Astronomical Society of the Pacific Conference Series, Statistical Approach to the Three-Body Problem. p. 45
- van Albada T. S., 1968, Bulletin of the Astronomical Institutes of the Netherlands, 19, 479
- van Zon R., van Beijeren H., Dellago C., 1998, Physical Review Letters, 80, 2035
- Vecheslavov V. V., Chirikov B. V., 1988, Pisma v Astronomicheskii Zhurnal, 14, 357
- Verlet L., 1967, PhysRev, 159, 98–103
- Vlasov A. A., 1968, Soviet Physics Uspekhi, 10, 721
- von Hoerner S., 1960, Z. Astrophys, 50, 184
- Wang L., Spurzem R., Aarseth S., Nitadori K., Berczik P., Kouwenhoven M. B. N., Naab T., 2015, Monthly Notices of the Royal Astronomical Society, 450, 4070
- Wisdom J., Holman M., 1991, Astronomical Journal, 102, 1528
- Yoshida H., 1990, Physics Letters A, 150, 262
- Zadunaisky P. E., 1979, Celestial Mechanics, 20, 209