

Soviet and Japanese Aerospace Literature

Throughout 1990 the *AIAA Journal* will carry selected abstracts on leading research topics from the Soviet aerospace literature and, as space permits, from similar Japanese literature. The topics will be chosen and the abstracts reviewed for pertinency by *AIAA Journal* editors. This month features Astrodynamics from the USSR and Aerodynamics from Japan.

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Soviet Aerospace Literature This month: *Astrodynamics*

A89-33999 Expansion of the spherical part of the perturbation function (Razlozhenie sfericheskoi chasti perturbatsionnoi funktsii). V. B. TITOV, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 66, Jan.-Feb. 1989, pp. 199-201. 7 Refs.

An expansion is obtained for the spherical (depending on the orbit orientation) part of the perturbation function. This expansion is performed using SO(3) matrix representation elements. Consideration is given to several functions which are frequently encountered.

A89-39814 Stability of the equilibrium of a rigid body with a gyroscope rotating around a horizontal axis on an absolutely smooth surface (Ustoichivost' ravnovesiia tverdogo tela s giroskopom, vrashchaiushchimsia vokrug gorizonta'noi osi, na absolutno gladkoi ploskosti). S. A. BELIKOV, *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela* (ISSN 0572-3299), Mar.-Apr. 1989, pp. 15-20. 8 Refs.

A Hamiltonian function is obtained which specifies canonic equations of gyrostat motion. The analysis is extended to a reduced Hamiltonian system with two degrees of freedom, and a Hamiltonian expansion is obtained in the vicinity of the equilibrium point corresponding to the partial solution to within fourth-order terms. In the region of acceptable parameter values, a region of necessary stability conditions is obtained which coincides with the region of the constant sign of the Hamiltonian function. In the case where the set of parameters belongs to the boundary of necessary stability conditions, the Hamiltonian is normalized, and sufficient stability conditions are obtained in terms of constraints on coefficients of normal form.

A89-23717 Asymptotic motions of an asymmetric rigid body in circular orbit in the presence of third-order resonance (Ob asimptoticheskikh dvizheniakh nesimmetrichnogo tverdogo tela na krugovoi orbite pri nalichii rezonansa tret'ego poriadka). S. D. FURTA, *Kosmicheskie Issledovaniia* (ISSN 0023-4206), Vol. 26, Nov.-Dec. 1988, pp. 943, 944.

The problem of the motion of an asymmetric rigid body whose center of mass moves in a Keplerian circular orbit in a Newtonian force field is studied. It was shown previously that this problem admits positions of relative equilibrium corresponding to the coincidence of the principal central axes of inertia of the body with axes of the orbital coordinate system. The present paper examines the existence of the motions of a rigid body tending to these positions of equilibrium with t tending to $+\infty$, in the case when the natural frequencies of the linearized system ω_1 , ω_2 , ω_3 are related as $\omega_3 = 2\omega_1$ or $\omega_3 = 2\omega_2$.

A90-15645 An addition to the Lawden theory (Dopolnenie k teorii Loudena). S. T. ZAVALISHCHIN, *Prikladnaia Matematika i Mekhanika* (ISSN 0032-8235), Vol. 53, Sept.-Oct. 1989, pp. 731-738. 7 Refs.

An expanded version of the mathematical model of the motion of a material point of variable mass in a central gravitational field is proposed which allows for the discrete consumption of the reactive mass and discontinuous changes in the reactive force direction. The problem of optimal orbital transfer programming is analyzed for the case of fixed transfer time. The possible regions of optimal transfers corresponding to impulse, zero, and intermediate thrusts are described. It is found that the intermediate thrust gives rise to a motion along a spiral that differs from the Lawden spiral.

A90-15620 Unified method for determining the initial orbits of celestial bodies from a small number of optical observations (Unifitsirovannyi metod opredeleniia predvaritel'nykh orbit nebesnykh tel po malomu chislu opticheskikh nabludenii). N. I. PEROV, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 66, Sept.-Oct. 1989, pp. 1093-1099. 29 Refs.

A method for calculating the position and velocity vectors of the unperturbed trajectories of artificial earth satellites using measurements of time and angular coordinates with KS variables is presented. The method can be applied to small (1 deg), medium, and large (360 deg) orbital arcs, to the curved and straight motions of satellites, and to their infinite and finite motions. Formulas are obtained for estimating the domain of convergence in which a unique solution of the problem posed exists, as well as for estimating the rate of convergence for arbitrary values of iterated parameters.

A90-13718 Assessment of the possibility of avoiding the collision of the earth with a cosmic body. L. M. SHKADOV, V. F. ILLARIONOV, and V. V. SONIN, *IAF 40th International Astronautical Congress*, Malaga, Spain, Oct. 7-13, 1989. 9 pp. 7 Refs. (IAF Paper 89-763).

A method that could be used for avoiding the collision, or a dangerous approach to it, of the earth with a cosmic body is considered. The method involves changing the location of the earth on the orbit at a given moment by imparting a moderate velocity impulse to the moon. Estimates of the needed earth deviation with respect to its position in an undisturbed motion are presented, together with allowable safe distances between a passing-by body and the earth, determined as a function of the body's mass. The required energy expenditures and the fraction of the moon's ejected mass necessary to impart the required velocity impulse to the moon are also estimated.

A90-12272 A class of near-periodic orbits (Klass orbit, blizkikh k periodicheskim). V. V. ORLOV, *Leningradskii Universitet, Vestnik, Matematika, Mekhanika, Astronomiia* (ISSN 0024-0850), July 1989, pp. 102-105. 6 Refs.

A study is made of the motion of a particle in the field of a rotationally symmetric potential in the comoving plane (R, z). An equation for the $\delta f/\delta n$ gradient of the field of motion directions normal to the trajectory is considered. It is shown that, for periodic orbits, at the points of their orthogonal intersection with the axis R, the value of $\delta f/\delta n$ equals zero. A condition is obtained for near-periodic orbits starting from the R axis.

A90-10022 Chaotic dynamics of Comet Halley. B. V. CHIRIKOV, and V. V. VECESLAVOV, *Astronomy and Astrophysics* (ISSN 0004-6361), Vol. 221, No. 1, Aug. 1989, pp. 146-154. 24 Refs.

A simple model of the dynamics of Halley's comet is developed, and its motion is shown to be chaotic due to the perturbations by Jupiter. Estimates for the error growth in the extrapolation of the comet's trajectory are obtained which particularly explain a sharp divergence of different extrapolations of Comet Halley's orbit previously obtained. Various mechanisms limiting the full sojourn time of the comet in the solar system are considered. These include the orbit diffusion under the perturbations by Jupiter and by Saturn, the orbit drift due to weak nongravitational forces as well as the prompt ejection of the comet from the solar system upon its very close encounter with Jupiter. The estimated sojourn time of Comet Halley in the solar system is compared to the period of hypothetical comet showers from the Oort cloud which is about 30 Myr.

A89-52888 Two-impulse transfers (between two coplanar Keplerian orbits of artificial satellites) (O dvukhimpul'snykh perekhodakh). A. I. AVERBUKH, *Kosmicheskii Issledovaniia* (ISSN 0023-4206), Vol. 27, July-Aug. 1989, pp. 509-513.

Plane transfers between two coplanar Keplerian orbits are examined. The set of points of the plane (w_1, w_2) whose coordinates are the moduli of the transfer impulses at each of the specified orbits is called the w-domain of these orbits. The form of the boundary of this domain and the characteristics of the transfer orbits corresponding to the points of this boundary are determined in the case when one of the orbits determining the w-domain is circular.

A89-52885 Evolution of the orbital elements of an artificial earth satellite over long periods of time (Evolutsiia elementov orbity iskusstvennogo sputnika zemli na dlitel'nykh intervalakh vremeni). B. N. NOSKOV, *Kosmicheskii Issledovaniia* (ISSN 0023-4206), Vol. 27, July-Aug. 1989, pp. 491-496.

An explicit time dependence is obtained for the analogs of the eccentricity and semimajor axis of the intermediate orbit of a satellite whose motion is affected by atmospheric drag. An analytical relationship is derived which makes it possible to estimate the satellite lifetime.

A89-52811 Effect of strong perturbations on the evolution of the outer layers of the Oort Cloud - Numerical simulation (Vlianie sil'nodeistviushchikh vozmushchenii na evoliutsiiu vneshnikh sloev oblaka Oorta - Chislennoe modelirovanie). V. M. CHEPUROVA and S. L. SHERSHKINA, *Kinematika i Fizika Nebesnykh Tel* (ISSN 0233-7665), Vol. 5, July-Aug. 1989, pp. 3-7. 11 Refs.

The evolution of the outer part of the Oort Cloud over 65 million years is investigated by numerically integrating the equations of the perturbed motion of comets by the 4th-order Runge-Kutta method. Perturbations resulting from a star passing by the solar system are considered as well as perturbations resulting from a giant molecular hydrogen cloud being crossed by the sun on the background of the constantly acting gravitational field of the Galaxy.

A89-50857 Quasi-static approach in the dynamics of a rigid body with internal degrees of freedom (Kvazistaticheskii podkhod v dinamike tverdogo tela s vnutrennimi stepeniami svobody). A. E. ZAKRZHEVSKII and V. S. KHOROSHILOV, *Kosmicheskaiia Nauka i Tekhnika* (ISSN 0321-4508), No. 3, 1988, pp. 43-48. 5 Refs.

Some aspects of the practical implementation of a quasi-static approach to the analysis of transition processes associated with the stabilization of a rigid body with an attached flexible element are discussed, as are methods for the synthesis of optimal reorientation control. The quasi-static approach described here is illustrated by numerical examples.

A89-49205 A study of nonstationary loads during the accelerated and abrupt motion of bodies of various shapes (Issledovanie nestatsionarnykh nagruzok pri uskorennom i vnezapnom dvizhenii tel razlichnoi formy). V. V. PODLUBNYI and A. S. FONAREV, *PMTF - Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki* (ISSN 0044-4626), May-June 1989, pp. 83-88.

The paper is concerned with the accelerated motion of several different bodies (a sphere, a cylinder, and a cone) from the position of rest to specified subsonic or supersonic velocities with various accelerations, including abrupt motion of a body with a specified velocity. The nonstationary aerodynamic characteristics of the bodies are obtained for different accelerations using a numerical method. An analytical procedure is proposed for calculating the initial pressure distribution and maximum forces in abrupt motion.

A89-49245 An intermediate orbit of a planetary satellite (Ob odnoi promezhutocnoi orbite sputnika planety). E. P. AKSENOV, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 66, May-June 1989, pp. 622-630.

A method for constructing the intermediate orbit of a planetary satellite is presented. It is based on the theory of Liapunov's periodic solutions. The intermediate orbit includes all of the inequalities in the satellite's motion caused by the second zonal harmonic of the planetary attraction potential. It can be used for the formulation of the analytical theory of planetary satellite motion, at least in those cases when the inclinations of their orbits to the equatorial plane are small.

A89-49243 The regular translational-rotational motion of two random solid bodies and their stability (Reguliarnye postupatel'no-vrashchatel'nye dvizheniia dvukh proizvol'nykh tverdykh tel i ikh ustoiichivost'). M. Z. ABUEL'NAGA, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 66, May-June 1989, pp. 604-611. 8 Refs.

Particular solutions are obtained for the translational-rotational motion of two rigid bodies having an arbitrary dynamic structure. The existence of 36 particular solutions, corresponding to 'arrow', 'spoke', and 'float' stationary motions, is revealed. The necessary and sufficient conditions of the stability of these motions are studied using the Liapunov function, which is taken as the Hamiltonian of the perturbed motion.

A89-48060 The plane periodic motions of a satellite relative to the mass center near a triangular libration point (Ploskie periodicheskie dvizheniia sputnika otnositel'no tsentra mass vblizi treugol'noi tochki libratsii). M. V. DEMIN, *Kosmicheskii Issledovaniia* (ISSN 0023-4206), Vol. 27, May-June 1989, pp. 347-352. 5 Refs.

The plane periodic motions of a satellite around its center of mass near the L4 libration point of the restricted circular three-body problem are studied. It is assumed that the motion of the satellite relative to the center of mass does not influence its orbital motion. The existence of $2(p)n$ periodic motions produced by the plane rotations and oscillations of arbitrary amplitude is studied.

A89-48059 The evolution of orbits in the twice-averaged Hill problem under the influence of small transverse acceleration (Evolutsiia orbit v dvukratno osrednennoi zadache Khilla pod vlianiem malogo transversal'nogo uskorenniia). V. G. PETUKHOV, *Kosmicheskii Issledovaniia* (ISSN 0023-4206), Vol. 27, May-June 1989, pp. 339-346. 9 Refs.

The motion of a spacecraft with small transverse acceleration in the Hill problem is studied. The averaged equations of the three-dimensional motion are applied to a set of third-order differential equations. This set permits partial solutions corresponding to two-dimensional motion and to motion in circular and polar orbits.

A89-48057 The determination of the rotational motion of a spacecraft using the results of measurements (Opredelenie vrashchatel'nogo dvizheniia KA po rezul'tatam izmerenii). V. S. ASLANOV, *Kosmicheskii Issledovaniia* (ISSN 0023-4206), Vol. 27, May-June 1989, pp. 323-332. 9 Refs.

A method for determining the rotational motion of a spacecraft and its parameters using the results of measurements is proposed. The method involves the use of the first integrals of motion or slowly varying functions dependent on the measurement vector components. Results of a comparative numerical analysis of the proposed integral method and the least squares method are presented in problems of extra atmospheric and atmospheric spacecraft motion.

A89-40504 Sequence of period doubling bifurcations for solutions to the plane bounded three-body problem (Poslidovnist' bifurkatsii podvoennia periodu rozv'iazkiv ploskoi obmezhenoii zadachi tr'okh til). V. I. GULIAEV, A. L. ZUBRITS'KA, and V. L. KOSHKIN, *Akademiia Nauk Ukrain'skoi RSR, Dopovidi, Seriia A - Fiziko-Matematichni ta Tekhnichni Nauki* (ISSN 0002-3531), March 1989, pp. 33-38. 15 Refs.

A method for constructing sequences of multiple period increase bifurcations for solutions to nonlinear ordinary differential equations is proposed which is based on the sequential linearization of the equations of motion, continuation in shooting, and branching theory methods. An analysis is made of the evolution of the periodic motions of a zero-mass body in the vicinity of a triangular libration point due to changes in the trajectory eccentricity of the attraction centers in the plane bounded three-body problem. A converging sequence of period doubling bifurcations is determined which has a nongeometrical convergence rate.

A89-37370 Application of the theory of multipoint boundary value problems to determine the orbit of a space object (Primenenie teorii mnogotochechnykh kraevykh zadach dlia opredeleniia orbity kosmicheskogo ob'ekta). I. U. P. BOGDANOVA and B. I. SEMENOV, *Kosmicheskii Issledovaniia* (ISSN 0023-4206), Vol. 27, Mar.-Apr. 1989, pp. 299-302.

A method for determining the orbit of a space object from angular measurements is proposed which is based on the use of the theory of multipoint boundary value problems for the set of ordinary nonlinear differential equations describing the motion of the object in the terrestrial spheroid field. The proposed approach makes it possible to synthesize algorithms for finding the orbit of a space object according to a minimum number of measurements.

A89-42472 1:1 resonance orbits in the plane circular restricted three-body problem (Rezonansnye orbity 1:1 ploskoi krugovoi ograniichennoi zadachi trekh tel). A. I. KOGAN, *Pioneers of space and the present age* (A89-42451 18-99). Moscow, Izdatel'stvo Nauka, 1988, pp. 151-161.

Two classes of trajectories are derived for the plane circular restricted three-body problem. Class I trajectories are similar to satellite trajectories but can be located far beyond the zero-velocity Hill line around the planet. Class II trajectories do not encompass the planet, the amplitude of the oscillatory motions of the planetocentric radius vector being less than π . Class II trajectories are further subdivided into two subclasses (a and b), with IIb including the trajectory used for the Saturn satellite system.

A89-38431 Optimal trajectory of an impulse coplanar transition between close circular orbits with a weak time constraint (Optimal'naia traektoriia impul'snogo komplanarnogo perekhoda mezhdu blizkimi krugovymi orbitami so slabym ograniicheniem na vremia). V. S. NOVOSELOV, *Leningradskii Universitet, Vestnik, Matematika, Mekhanika, Astronomiia* (ISSN 0024-0850), Jan. 1989, pp. 76-80.

An analytical expression for a two-pulse orbital transfer is obtained using general-purpose formulas in terms of conjugate variables. It is shown that the requirement for the duration of the first-order transfer leads to increased third-order characteristic velocities, with nontransversal first-order impulses.

A89-37384 Transplutonian cometary families (O transplutonovykh kometykh semeistvakh). A. S. GULIEV and A. S. DADASHOV, *Astronomicheskii Vestnik* (ISSN 0320-930X), Vol. 23, Jan.-Mar. 1989, pp. 88-96. 11 Refs.

Five transplutonian cometary families were identified based on the proximity of their aphelion distances. The possibility of the formation of these groups by hypothetical planets is considered. It is shown that, for two groups at distances of 55 and 100 a.u. with angles of inclination of 30 deg, the existence of a mother planet is likely. For the remaining three groups, this possibility is unlikely.

A89-37354 Stationary motions of an axisymmetric satellite in circular orbit (O statsionarnykh dvizheniakh osesimmetrichnogo sputnika na krugovoi orbite). M. Z. ABUL'NAGA, *Kosmicheskie Issledovaniia* (ISSN 0023-4206), Vol. 27, Mar.-Apr. 1989, pp. 176-179. 5 Refs.

Stationary solutions are obtained to the problem of the rotation of a rigid axisymmetric satellite whose mass center moves in circular Keplerian orbit. The second and third harmonics are conserved in the force-function expansion. In particular, solutions are obtained which generalize the conical and hyperbolic precession of a satellite described by Sarychev (1978).

A89-33992 States of strong gravitational interaction in the general three-body problem (Sostoianiiia sil'nogo gravitatsionnogo vzaimodeistviia v obshchei zadache trekh tel). ZH. P. ANOSOVA and N. N. ZAVALOV, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 66, Jan.-Feb. 1989, pp. 152-160. 27 Refs.

The states of the 'triple approach' of bodies at the beginning of the dynamic evolution of systems are studied via computer simulation using the three-body problem with components having equal masses and zero initial velocities. Regions of initial configurations of the triple systems are found in which the actual decay of the system takes place after the first triple approach of the bodies. These regions are situated along the isolines of the ratios of the distances between the components at the initial time.

A89-13123 Simulation of the spiral structure caused by elliptically-orbiting satellites (Modelirovanie generatsii spiral'noi struktury sputnikami s ellipticheskimi orbitami). V. I. KORCHAGIN, E. A. LANGUEVA, and N. A. PROKHOVNIK, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 65, July-Aug. 1988, pp. 868-876. 23 Refs.

A large-scale wave pattern excited by a satellite moving in elliptic orbit in the plane of the galactic disk is studied numerically. It is shown that the satellite orbiting in the direction of disk rotation is an effective generator of a large-scale pattern. For slightly elongated orbits ($e = 0.5$), the wave pattern has two asymmetric trailing arms with one arm continuing as a bridge to the satellite. For the more elongated periodic orbits, the spiral structure may be divided into two regions. In the central regions of the disk with rotation close to the solid body, an open leading two-armed spiral structure arises. Outside this region, the spiral winding reverses to a trailing spiral pattern. The density amplitude of the central spiral branch is about 30 percent for a satellite/parent galaxy mass ratio of 3 percent.

A89-32284 Relativistic equations of motion of the earth's satellite in the geocentric frame of reference (Relativistskie uravneniia dvizheniia sputnika zemli v geotsentricheskoi sisteme otscheta). V. A. BRUMBERG and S. M. KOPEIKIN, *Kinematika i Fizika Nebesnykh Tel* (ISSN 0233-7665), Vol. 5, Jan.-Feb. 1989, pp. 3-8. 17 Refs.

Relativistic equations of motion of the earth's satellite in the harmonic nonrotating geocentric coordinate system are presented. In the relativistic parts of the equations, the Schwarzschild, Lense-Thirring, and quadrupole perturbations from the earth as well as tidal perturbations from the sun and moon are taken into account. The equations are derived by transforming the satellite's equations of motion from the barycentric coordinate system to the geocentric one, and by directly applying the geodesic principle in the geocentric coordinate system.

A89-39810 Periodic solutions in the vicinity of a triangular libration point of the elliptical three-body problem (Periodicheskie resheniia v okrestnosti treugol'noi tochki libratsii ellipticheskoi zadachi trekh tel). V. P. EVTEEV and E. M. MUKHAMADIEV, *Prikladnaia Matematika i Mekhanika* (ISSN 0032-8235), Vol. 53, Mar.-Apr. 1989, pp. 339-341.

Two classes of periodic orbits in the plane elliptical three-body problem are identified. The investigation is based on a variant of the small-parameter method, where the eccentricity of the problem is the small parameter.

A89-33993 Euler-Newton-type differential equations for osculating Eulerian elements (O differentsial'nykh uravneniakh tipa Eilera-N'iutona dlia oskuliruiushchikh eilerovykh lementov). V. A. TAMAROV and E. P. STREZHENKOVA, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 66, Jan.-Feb. 1989, pp. 161-171.

Euler-Newton-type differential equations are obtained for the a , e , s , l , g , and h elements of the satellite's intermediate orbit. An asymmetrical variant of the Eulerian orbit was used as the intermediate one. The coefficients of the components of the perturbing acceleration are represented in the equations with an accuracy up to the terms proportional to parameters having the order of the oblateness of the earth.

A89-33992 States of strong gravitational interaction in the general three-body problem (Sostoianiiia sil'nogo gravitatsionnogo vzaimodeistviia v obshchei zadache trekh tel). ZH. P. ANOSOVA and N. N. ZAVALOV, *Astronomicheskii Zhurnal* (ISSN 0004-6299), Vol. 66, Jan.-Feb. 1989, pp. 152-160. 27 Refs.

The states of the 'triple approach' of bodies at the beginning of the dynamic evolution of systems are studied via computer simulation using the three-body problem with components having equal masses and zero initial velocities. Regions of initial configurations of the triple systems are found in which the actual decay of the system takes place after the first triple approach of the bodies. These regions are situated along the isolines of the ratios of the distances between the components at the initial time.

A89-30190 Kinematic characteristics of faint meteors according to observations using an image converter (Kinematicheskie kharakteristiki slabnykh meteorov na osnove elektronno-opticheskikh nabludenii). S. MUKHAMEDNAZAROV, O. G. OVEZGEL'DYEV, R. I. SHAFIEV, and G. V. ANDREEV, *Akademiia Nauk Turkmen'skoi SSR, Izvestiia, Seria Fiziko-Tekhnicheskikh, Khimicheskikh i Geologicheskikh Nauk* (ISSN 0002-3507), No. 6, 1988, pp. 28-37. 32 Refs.

A catalog of radiants, velocities, and orbital elements of faint meteors observed from 1977 to 1981 with the image-converter camera at the Physico-technical Institute of the Turkmen Academy of Sciences is presented. Of 84 meteoroid orbits listed in the catalog, 62 have been identified; 27 of them have been identified with small showers.

A89-30180 Motion of asteroids near 2:1 commensurability - Comparison of an analytical model with results of numerical integration (Dvizhenie asteroidov vblizi soizmerimosti 2:1 - Sravnenie analiticheskoi modeli s dannymi chislennogo integrirvaniia). I. A. GERASIMOV, *Moskovskii Universitet, Vestnik, Seria 3 - Fizika, Astronomiia* (ISSN 0579-9392), Vol. 29, Sept.-Oct. 1988, p. 71-75. 6 Refs.

Results of a previous qualitative analysis of the motion of asteroids near the 2:1 commensurability with Jupiter are compared with results of the numerical integration of the equations of the plane version of the circular restricted three-body problem. Steady-state solutions are examined. It is concluded that the comparison demonstrates the correctness of the analytical model chosen.

A89-27475 The stability of stationary motions of two gravitating bodies - Spherically-symmetric and axisymmetric bodies compressed along the axis of symmetry (Ob ustoiichivosti statsionarnykh dvizhenii dvukh gravitiruiushchikh tel - Sfericheskii-simmetrichnogo i osesimmetrichnogo, szhatogo vdol' osi simmetrii). A. A. KOKOREV and S. N. KIRPICHNIKOV, *Pis'ma v Astronomicheskii Zhurnal* (ISSN 0320-0108), Vol. 14, Nov. 1988, pp. 1046-1054.

The orbital stability of stationary motions in the coplanar problem of the relative motion of two gravitating bodies is studied. The first body, M , is axisymmetric with the center of mass at point O . The other is spherical and is replaced by a gravitating point, M sub 0 . For stationary motion, when the angle between OM sub 0 and the axis of symmetry of M does not equal 0 or equals 90 deg, the conditions of orbital stability and the stability of rotational movement are obtained as inequalities for the orbital radius OM sub 0 .

A89-26167 Integrable case of perturbed Keplerian motion (Ob integriruemom slucae vozmushchennogo keplerovskogo dvizheniia). V. A. KUZ'MINYKH, *Prikladnaia Matematika i Mekhanika* (ISSN 0032-8235), Vol. 52, Nov.-Dec. 1988, pp. 1033-1036. 7 Refs.

A general solution to the vector differential equation of perturbed Keplerian motion is obtained for the case where the position and perturbing acceleration vectors are collinear. Variable substitution is used whereby a new independent variable is expressed in terms of the initial values of the phase variables and time is expressed in terms of the elliptic Jacobi function. The two-point boundary value problem for the initial equations is reduced to the Cauchy problem. A parametric expression is obtained for the regularized motion trajectory of a material point under the effect of a central force.