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Oleg Kirillov

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*Oleg N. Kirillov*

# NONCONSERVATIVE STABILITY PROBLEMS OF MODERN PHYSICS

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Oleg N. Kirillov

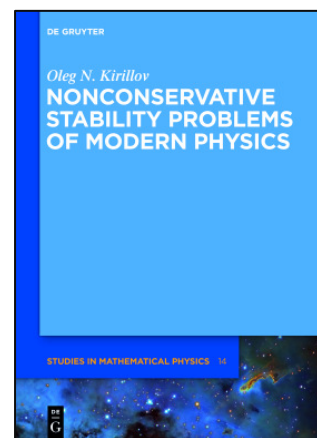
# NONCONSERVATIVE STABILITY PROBLEMS OF MODERN PHYSICS

This work gives a complete overview on the subject of nonconservative stability from the modern point of view. Relevant mathematical concepts are presented, as well as rigorous stability results and numerous classical and contemporary examples from mechanics and physics.

It deals with both finite- and infinite-dimensional nonconservative systems and covers the fundamentals of the theory, including such topics as Lyapunov stability and linear stability analysis, Hamiltonian and gyroscopic systems, reversible and circulatory systems, influence of structure of forces on stability, and dissipation-induced instabilities, as well as concrete physical problems, including perturbative techniques for nonself-adjoint boundary eigenvalue problems, theory of the destabilization paradox due to small damping in continuous circulatory systems, Krein-space related perturbation theory for the MHD kinematic mean field  $\alpha^2$ -dynamo, analysis of Campbell diagrams and friction-induced flutter in gyroscopic continua, non-Hermitian perturbation of Hermitian matrices with applications to optics, and magnetorotational instability and the Velikhov-Chandrasekhar paradox.

The book serves present and prospective specialists providing the current state of knowledge in the actively developing field of nonconservative stability theory. Its understanding is vital for many areas of technology, ranging from such traditional ones as rotor dynamics, aeroelasticity and structural mechanics to modern problems of hydro- and magnetohydrodynamics and celestial mechanics.

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# Contents

Preface	vii
<b>1 Introduction</b>	<b>1</b>
1.1 Gyroscopic stabilization on a rotating surface	1
1.1.1 Brouwer's mechanical model	2
1.1.2 Eigenvalue problems and the characteristic equation	2
1.1.3 Eigencurves and bifurcation of multiple eigenvalues	4
1.1.4 Singular stability boundary of the rotating saddle trap	8
1.2 Manifestations of Brouwer's model in physics	10
1.2.1 Stability of deformable rotors	10
1.2.2 Foucault's pendulum, Bryan's effect, Coriolis vibratory gyroscopes, and the Hannay–Berry phase	15
1.2.3 Polarized light within a cholesteric liquid crystal	16
1.2.4 Helical magnetic quadrupole focussing systems	17
1.2.5 Modulational instability	19
1.3 Brouwer's problem with damping and circulatory forces	24
1.3.1 Circulatory forces	25
1.3.2 Dissipation-induced instability of negative energy modes	25
1.3.3 Circulatory systems and the destabilization paradox	27
1.3.4 Merkin's theorem, Nicolai's paradox, and subcritical flutter	28
1.3.5 Indefinite damping and parity-time ( $\mathcal{PT}$ ) symmetry	30
1.4 Scope of the book	33
<b>2 Lyapunov stability and linear stability analysis</b>	<b>36</b>
2.1 Main facts and definitions	37
2.1.1 Stability, instability, and uniform stability	38
2.1.2 Attractivity and asymptotic stability	38
2.1.3 Autonomous, nonautonomous, and periodic systems	39
2.2 The direct (second) method of Lyapunov	40
2.2.1 Lyapunov functions	40
2.2.2 Lyapunov and Persidskii theorems on stability	40
2.2.3 Chetaev and Lyapunov theorems on instability	41
2.3 The indirect (first) method of Lyapunov	42
2.3.1 Linearization	43

2.3.2	The characteristic exponent of a solution . . . . .	43
2.3.3	Lyapunov regularity of linearization . . . . .	44
2.3.4	Stability and instability in the first approximation . . . . .	46
2.4	Linear stability analysis . . . . .	47
2.4.1	Autonomous systems . . . . .	47
2.4.2	Lyapunov transformation and reducibility . . . . .	48
2.4.3	Periodic systems . . . . .	49
2.4.4	Example. Coupled parametric oscillators . . . . .	51
2.5	Algebraic criteria for asymptotic stability . . . . .	54
2.5.1	Lyapunov's matrix equation and stability criterion . . . . .	54
2.5.2	The Leverrier–Faddeev algorithm and Lewin's formula . . . . .	55
2.5.3	Müller's solution to the matrix Lyapunov equation . . . . .	56
2.5.4	Inertia theorems and observability index . . . . .	57
2.5.5	Hermite's criterion via the matrix Lyapunov equation . . . . .	58
2.5.6	Routh–Hurwitz, Liénard–Chipart, and Bilharz criteria . . . . .	60
2.6	Robust Hurwitz stability vs. structural instability . . . . .	61
2.6.1	Multiple eigenvalues: singularities and structural instabilities . . . . .	62
2.6.2	Multiple eigenvalues: spectral abscissa minimization and robust stability . . . . .	64
<b>3</b>	<b>Hamiltonian and gyroscopic systems</b> . . . . .	<b>67</b>
3.1	Sobolev's top and an indefinite metric . . . . .	68
3.2	Elements of Pontryagin and Krein space theory . . . . .	72
3.3	Canonical and Hamiltonian equations . . . . .	74
3.3.1	Krein signature of eigenvalues . . . . .	76
3.3.2	Krein collision or linear Hamiltonian–Hopf bifurcation . . . . .	77
3.3.3	MacKay's cones, veering, and instability bubbles . . . . .	78
3.3.4	Instability degree and count of eigenvalues . . . . .	80
3.3.5	Graphical interpretation of the Krein signature . . . . .	82
3.3.6	Strong stability: robustness to Hamiltonian's variation . . . . .	86
3.3.7	Inertia theorems and stability of gyroscopic systems . . . . .	87
3.3.8	Positive and negative energy modes and Krein signature . . . . .	88
3.3.9	Dispersive wave propagation in conservative systems . . . . .	90
3.3.10	Absolute and convective instability . . . . .	92
<b>4</b>	<b>Reversible and circulatory systems</b> . . . . .	<b>95</b>
4.1	Reversible systems . . . . .	95
4.2	Nonconservative positional forces . . . . .	96
4.3	Circulatory systems . . . . .	97
4.3.1	Divergence and flutter instabilities . . . . .	98

4.3.2	Multiple parameter families of circulatory systems . . . . .	98
4.3.3	Generic singularities on the stability boundary . . . . .	99
4.4	Perturbation of eigenvalues . . . . .	101
4.4.1	Simple eigenvalue . . . . .	102
4.4.2	Double eigenvalue of geometric multiplicity 1 . . . . .	103
4.4.3	Double eigenvalue of geometric multiplicity 2 . . . . .	105
4.4.4	Triple eigenvalue of geometric multiplicity 1 . . . . .	106
4.5	Geometry of the stability boundary . . . . .	108
4.5.1	Linear and quadratic approximations at smooth points . . . . .	108
4.5.2	Singularities in two-parameter circulatory systems . . . . .	110
4.5.3	Example. Stabilization of comfortable walking . . . . .	114
4.5.4	Singularities in three-parameter circulatory systems . . . . .	117
4.5.5	The cone $\alpha\alpha$ and Merkin's instability theorem . . . . .	124
4.5.6	Example: a brake disk in distributed frictional contact . . . . .	126
4.5.7	Example: stability of an airfoil in an inviscid flow . . . . .	129
4.6	Eigencurves, their crossing and veering . . . . .	133
4.6.1	Convex flutter domain: conical point $\alpha\alpha$ . . . . .	133
4.6.2	Convex/concave flutter domain: smooth points $\alpha^2$ . . . . .	134
4.7	Parametric optimization of circulatory systems . . . . .	138
4.7.1	Example: optimization of Ziegler's pendulum . . . . .	139
4.7.2	A nonsmooth and nonconvex optimization problem . . . . .	141
4.7.3	The gradient of the critical load . . . . .	142
4.7.4	An infinite gradient at the crossing of the eigencurves . . . . .	143
4.7.5	Improving variations and necessary conditions for optimality in the case where the eigencurves cross . . . . .	143
<b>5</b>	<b>Influence of structure of forces on stability</b> . . . . .	<b>146</b>
5.1	Undamped potential systems . . . . .	147
5.1.1	Lagrange's theorem and Poincaré instability degree . . . . .	148
5.1.2	Rayleigh's theorem on movement of eigenvalues . . . . .	148
5.1.3	Steady-state bifurcation . . . . .	148
5.2	Damped potential systems . . . . .	149
5.2.1	Overdamped and heavily damped systems . . . . .	150
5.2.2	Indefinitely damped systems . . . . .	154
5.3	Undamped gyroscopic systems . . . . .	160
5.3.1	Extension of Rayleigh's theorem . . . . .	161
5.3.2	Criteria of gyroscopic stabilization . . . . .	161
5.4	Damped gyroscopic systems . . . . .	162
5.4.1	Kelvin–Tait–Chetaev theorem . . . . .	163

5.5	Circulatory systems with and without velocity-dependent forces . . . . .	164
5.5.1	Merkin's theorem and Bulatovic's flutter condition . . . . .	165
5.5.2	Bottema–Lakhadanov–Karapetyan theorem . . . . .	166
5.5.3	Stabilizing and destabilizing damping configurations . . . . .	167
<b>6</b>	<b>Dissipation-induced instabilities</b> . . . . .	<b>171</b>
6.1	Crandall's gyropendulum . . . . .	171
6.1.1	Conservative gyroscopic stabilization and its destruction by stationary damping . . . . .	172
6.1.2	Singular threshold of the nonconservative gyroscopic stabilization . . . . .	173
6.1.3	Imperfect Krein collision and exchange of instability between negative and positive energy modes . . . . .	174
6.2	Gyroscopic stabilization of nonconservative systems . . . . .	176
6.2.1	The case of $m = 2$ degrees of freedom . . . . .	177
6.2.2	The case of arbitrary even $m$ . . . . .	184
6.3	Near-Hamiltonian systems . . . . .	188
6.4	Gyroscopic and circulatory systems as limits of dissipative systems . .	190
<b>7</b>	<b>Nonself-adjoint boundary eigenvalue problems</b> . . . . .	<b>200</b>
7.1	Adjoint boundary eigenvalue problems . . . . .	202
7.2	Perturbation of eigenvalues . . . . .	204
7.2.1	Semisimple eigenvalues . . . . .	205
7.2.2	Multiple eigenvalues with the Keldysh chain . . . . .	207
7.2.3	Higher order perturbation terms for double nonderogatory eigenvalues . . . . .	209
7.2.4	Degenerate splitting of double nonderogatory eigenvalues . . .	211
7.3	Example: a rotating circular string with an elastic restraint . . . . .	213
7.4	Example: the Herrmann–Smith paradox . . . . .	217
7.4.1	Formulation of the problem . . . . .	217
7.4.2	Stationary flutter domain and mobile divergence region . . . . .	220
7.4.3	Sensitivity of the critical flutter load to the redistribution of the elasticity modulus . . . . .	222
7.5	Example: Beck's column loaded by a partially follower force . . . . .	223
7.5.1	The stability-divergence boundary (point $A$ ) . . . . .	225
7.5.2	The flutter threshold of Beck's column (point $C$ ) . . . . .	226
7.5.3	The singularity $0^2$ on the stability boundary (point $B$ ) . . . . .	230

<b>8</b>	<b>Destabilization paradox in continuous circulatory systems</b>	233
8.1	Movement of eigenvalues under a velocity-dependent perturbation . . .	236
8.1.1	Generalized boundary eigenvalue problem . . . . .	237
8.1.2	Variation of parameters that is transversal to the stability boundary . . . . .	239
8.1.3	Variation of parameters that is tangential to the stability boundary . . . . .	240
8.1.4	Transfer of instability between modes . . . . .	242
8.1.5	Drop in the critical frequency . . . . .	243
8.2	Singular threshold of the flutter instability . . . . .	244
8.2.1	Drop in the critical flutter load . . . . .	245
8.2.2	The “no drop” condition and the tangent cone to the domain of asymptotic stability . . . . .	246
8.3	Example: dissipation-induced instability of Beck’s column . . . . .	249
8.3.1	Beck’s column without damping . . . . .	250
8.3.2	Beck’s column with Kelvin–Voigt and viscous damping . . . . .	251
8.3.3	Viscoelastic Beck’s column with a dash-pot . . . . .	255
8.3.4	Ziegler’s pendulum with a dash-pot . . . . .	259
8.4	Application to finite-dimensional systems . . . . .	260
8.4.1	The destabilization paradox in Ziegler’s pendulum . . . . .	261
<b>9</b>	<b>MHD kinematic mean field <math>\alpha^2</math>-dynamo</b>	266
9.1	Eigenvalue problem for $\alpha^2$ -dynamo . . . . .	266
9.2	Uniform $\alpha$ -profiles generate only nonoscillatory dynamos . . . . .	270
9.2.1	Conducting exterior: self-adjointness in a Krein space . . . . .	271
9.2.2	Basis properties of eigenfunctions . . . . .	272
9.2.3	Spectral mesh of eigencurves . . . . .	273
9.2.4	Deformation of the spectral mesh via transition from conducting to insulating surrounding . . . . .	274
9.3	Nonhomogeneous $\alpha$ -profiles and the conducting exterior . . . . .	275
9.3.1	$l \geq 0$ : definite Krein signature prohibits formation of complex eigenvalues . . . . .	276
9.3.2	$l = 0$ : oscillating solutions from the repeated decaying modes with mixed Krein signature . . . . .	280
9.3.3	$l = 0$ : Fourier components of $\alpha(x)$ determine the unfolding pattern of the spectral mesh. . . . .	284
9.4	Insulating boundary conditions induce unstable oscillations . . . . .	287
9.4.1	$l = 0$ : complex unfolding of double eigenvalues with definite Krein signature . . . . .	289



<b>10 Campbell diagrams and subcritical friction-induced flutter</b>	294
10.1 Friction-induced vibrations and sound generation	294
10.2 Example. Subcritical flutter of a rotating circular string	297
10.3 Axially symmetric rotor with anisotropic stator	304
10.3.1 Sensitivity analysis of the Campbell diagram	307
10.3.2 MacKay's eigenvalue cones and instability bubbles	309
10.3.3 Double-coffee-filter singularity near the crossings with definite Krein signature	312
10.3.4 Unfolding MacKay's cones with mixed Krein signature	316
10.3.5 Indefinite damping as a reason for subcritical flutter	317
10.3.6 Destabilizing role of circulatory forces	320
10.4 Example: eigenvalue surfaces of the rotating circular string	323
10.5 How to play a disk brake?	327
<b>11 Non-Hermitian perturbation of Hermitian matrices</b>	329
11.1 Eigenvalue movement through a 1:1 resonance in complex matrices	332
11.1.1 Diabolical point (DP): passing of eigenvalues	333
11.1.2 Exceptional point (EP): splitting of eigenvalues	334
11.2 Eigensurfaces associated with DPs	335
11.2.1 Complex perturbation of a Hermitian matrix family	336
11.2.2 DP in the spectrum of real symmetric matrices	337
11.2.3 How a DP unfolds into the conical wedge of Wallis	337
11.2.4 Inflating the diabolical point into an exceptional ring	341
11.2.5 Example: flutter instability in granular flow	342
11.3 Unfolding conical singularities in crystal optics	344
11.3.1 DPs in Hamilton's conical refraction	345
11.3.2 Approximation of the dispersion surface near a DP	347
11.3.3 Eigensurfaces of absorption- and chirality-dominated crystals	347
11.4 Eigensurfaces associated with EPs	350
11.5 Perturbation of eigenvectors and Berry phase	355
11.5.1 Hermitian case: geometric phase around a DP	355
11.5.2 Non-Hermitian case: geometric phase around an EP	357
11.5.3 Geometric phase around an EP in a microwave cavity	360
<b>12 Magnetorotational instability</b>	364
12.1 Magnetorotational instability in axial and helical magnetic fields	364
12.1.1 Cylindrical Couette–Taylor flow	364
12.1.2 Paradox of Velikhov and Chandrasekhar	367

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12.1.3	Magnetorotational instability in astrophysics and its analogues in celestial mechanics . . . . .	368
12.1.4	Laboratory experiments with CT-flow in axial and helical magnetic fields . . . . .	370
12.2	Mathematical setting . . . . .	371
12.2.1	Nonlinear equations and a steady state . . . . .	371
12.2.2	Linearization with respect to nonaxisymmetric perturbations . . . . .	372
12.3	Geometrical optics approximation . . . . .	373
12.4	Stability analysis . . . . .	377
12.4.1	The threshold of the standard MRI . . . . .	377
12.4.2	Singularities and the Velikhov–Chandrasekhar paradox . . . . .	378
12.4.3	The singular threshold of the HMRI and connection of HMRI and SMRI through a spectral exceptional point . . . . .	381
	Bibliography . . . . .	387
	Index . . . . .	423

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# Index

- absolute instability, 93, 313
- absorption-dominated crystal, 348
- accelerator physics, 13
- acoustic tensor, 342
- acoustics of friction, 126, 294
- adjoint boundary conditions, 204
- adjoint boundary eigenvalue problem, 204
- adjoint differential expression, 203
- aircraft flutter, 233
- Alfvén frequency, 369
- algebraic multiplicity, 4, 47, 73
- anti-unitary symmetry, 95
- Arnold, V. I., viii, 233
- associated element, 73
- associated vector, 77
- asymptotic stability, 22, 39, 240
- attractive equilibrium, 39
- automotive brake squeal, 126
- autonomous dynamical system, 39, 304
- avoided crossing, 13, 80, 215, 278
  
- backward wave, 90
- Balbus, S. A., 364
- Barnett, S., 147
- baroclinic instability, 233
- Beck's column, 202, 234
- Beletsky, V. V., 146
- Benjamin-Feir instability, 19
- Berry phase, 16, 356
- Berry, M. V., 356
- Bespalov-Talanov instability, 19
- betatron, 267
- bifurcation diagram, 99
- Bilharz criterion, 61, 382
- Bilharz, H., 61
- bilinear form, 72
- Binding, P., 266
- binormal, 346
  
- biradial, 346
- Bloch function, 53
- Bloch wave, 53
- Bolotin, V. V., vii, 233
- Bottema, O., viii, 28, 62, 233
- Bottema-Lakhadanov-Karapetyan theorem, 166, 197, 300
- boundary conditions, 203
- boundary form, 202
- Braginsky, S. I., 364
- branch cut, 314, 354, 361
- Brillouin zone, 53
- Brouwer, L. E. J., 1, 10
- Brouwer's particle in a rotating vessel, 1, 52
- Bryan, G. H., 11
- Bryan's effect, 11
- bubble of instability, 13, 80, 133, 135, 215, 278, 296
- Bulatovic, R. M., 125, 150
- Bulatovic's flutter condition, 125, 166
  
- calender barring, 98, 294
- Campbell, W., 13
- Campbell diagram, 13, 200, 295
- canonical equation, 75
- Chandrasekhar, S., viii
- characteristic equation, 3
- characteristic exponent, 44
- Chetaev, N. G., 42, 163
- Chetaev instability theorem, 42
- Chetaev-Malkin-Massera criterion, 46
- chirality, 17, 53, 267
- chirality-dominated crystal, 348
- circular polarization, 10
- circulatory forces, 25, 97, 146, 172, 267, 295
- circulatory system, 27, 97, 146, 234
- codimension, 63, 72, 337

- coefficient of irregularity, 45  
 combination parametric resonance, 215, 310  
 combination parametric resonance of difference type, 305  
 combination parametric resonance of summation type, 216  
 comfortable walking, 115  
 companion matrix, 58  
 complete spectrum of a linear system, 45  
 condition number of an eigenvalue, 208  
 conical wedge of Wallis, 329, 340  
 conservation law, 92  
 conservative forces, 97  
 convective instability, 93, 313  
 Coriolis force, 11  
 Coriolis vibratory gyroscope, 10  
 Couette, M., 364  
 Couette–Taylor flow, 333, 364  
 coupled parametric oscillators, 51  
 Crandall, S. H., 171  
 Crandall’s gyropendulum, 171  
 critical load functional, 142  
 critical rotor speed, 296  
 crossing of eigencurves, 132  
 curl force, 267  
 cuspidal edge, 118  
 cuspidal point, 6, 112, 248  
 CVG, 10
- damping forces, 146, 172  
 De Laval, K., 12  
 decrescent function, 40  
 defect (of an eigenvalue), 6  
 defective eigenvalue, 6  
 definite Krein signature, 14, 77, 274  
 Demidovich, B. P., 44  
 deviation, 37  
 deviator, 97  
 diabolical point, 1, 21, 202, 216, 311, 333  
 differential expression, 202  
 discriminant, 151, 386  
 discriminant matrix, 164  
 discriminant sequence, 164  
 dispersion, 53  
 dispersion curve, 53, 92  
 dispersion relation, 36, 53, 92, 377
- dissipation-induced instabilities, 24, 97  
 divergence, 5, 78, 98, 148  
 domain of attraction of an equilibrium, 39  
 double-coffee-filter, 315, 340, 349  
 double refraction, 330  
 DRES-DYN experiment, 68  
 drop in the critical flutter frequency, 244  
 drop in the critical flutter load, 246  
 dynamic materials, 312
- eigencurve, 53, 83, 128, 133, 200, 215, 295, 331  
 eigenelement, 201  
 eigensurface, 331  
 eigenvalue, 3, 73  
 eigenvalue assignment, 309  
 eigenvalue problem, 3  
 eigenvector, 3  
 elastoplastic continuum, 342  
 energy band, 53  
 energy density, 92  
 energy flux, 92  
 EP-set, 64, 332, 358  
 equilibrium, 2, 38  
 Erugin, N. P., 49  
 Erugin theorem, 49  
 Evans–Krein function, 83  
 exceptional point, 1, 28, 31, 136, 202, 216, 283, 312, 331, 334, 357  
 exceptional ring, 342  
 extended Beck’s problem, 223  
 external conical refraction, 347  
 external damping, 25
- Föppl, A., 10  
 fast precession, 176  
 first Lyapunov instability theorem, 42  
 Floquet, G., 50  
 Floquet exponent, 50  
 Floquet factor, 50  
 Floquet multiplier, 50  
 Floquet representation theorem, 50  
 fluid-structure interaction, 233  
 flutter, 6, 78, 98  
 flutter condition, 208  
 flutter domain, 80, 216  
 flutter ill-posedness, 342



- follower force, 25, 97, 128, 139  
 follower torque, 128  
 forward wave, 90  
 Foucault pendulum, 12, 15  
 fractional derivative, 237  
 Franklin, B., 294  
 Freitas, P., 152, 155  
 Fresnel's equation of wave normals, 345  
 Fresnel's wave surface, 346  
 friction-induced instabilities, 126  
 Frobenius matrix, 58  
 full observability, 58, 149  
 fundamental matrix, 43  
 fundamental symmetry, 72  
  
 Galilei, G., 294  
 Gallina criterion, 139, 165  
 Gamow state, 357  
 general nonconservative system, 146, 171  
 generalized coordinates, 76  
 generalized eigenvector, 6  
 generalized momenta, 76  
 generator of a ruled surface, 63, 329  
 generic singularity, 63  
 geometric multiplicity, 6, 47, 332  
 geometric phase, 16, 357, 359  
 geometrical optics expansions, 373  
 glass harmonica, 294  
 Gram matrix, 78  
 granular flow, 342  
 Greenhill, A. G., 29, 67, 128  
 gyrator, 30  
 gyroscopic force, 17, 87, 146  
 gyroscopic pendulum, 171  
 gyroscopic stabilization, 5, 26, 67, 161  
 gyroscopic system, 14, 88, 146  
  
 Hagedorn, P., 161  
 Hahn, W., 38  
 Hamilton's conical refraction, 330  
 Hamiltonian, 76  
 Hamiltonian equation, 75  
 Hamiltonian system, 14  
 Hamiltonian–Hopf bifurcation, 6, 78, 96  
 Hannay's angle, 16  
 heavily damped system, 150, 275, 296  
 helical MRI, 370  
  
 hereditary damping, 237  
 Hermite, Ch., 60  
 Hermite's criterion for asymptotic stability, 60  
 Hermite's matrix, 59  
 Herrmann-Smith paradox, 217  
 homogenization, 53  
 Hurwitz determinants, 57  
 Hurwitz matrix, 57  
 Hurwitz polynomial, 60  
 Huseyin, K., 161  
  
 imperfect merging of modes, 31, 173, 242, 352  
 indefinite damping, 21, 31, 152, 154, 181, 294  
 indefinite metric, 70, 72  
 inertia forces, 146  
 inertia of a matrix, 57  
 inertial circle, 53  
 inertial oscillations, 7  
 inertial wave, 7, 371, 380  
 infinitesimally symplectic matrix, 14  
 instability, 38  
 instability degree, 82  
 internal conical refraction, 331, 346  
 internal damping, 25  
 Ioshizawa, T., 39  
 Ioshizawa Theorem, 39  
 isoperimetric constraint, 140  
  
*J*-selfadjoint operator, 73  
 Jacobian matrix, 43  
 Jeffcott, H., 10  
 Jeffcott rotor, 10, 26  
 Jellett's egg, 67  
 Jordan block, 47  
 Jordan canonical form, 47  
 Jordan chain, 6, 73  
  
 Kármán, Th. von, 10  
 Kalman, R. E., 59  
 Kapitsa, P. L., 126  
 Keldysh, M. V., viii  
 Keldysh chain, 6, 207  
 Kelvin, W., 1, 36, 67, 163  
 Kelvin–Tait–Chetaev theorem, 26, 91, 163

- Kelvin–Voigt damping, 234  
 Kharitonov, V. L., 62  
 Kharitonov theorem, 61, 62  
 ‘kidneys’, 355  
 Kimball, A. L., 25  
 kinematic dynamo, 266  
 kinetic energy, 88, 96  
 Kozlov, V. V., 82  
 Krein collision, 6, 78, 201  
 Krein signature, 14, 76, 311  
 Krein space, 73, 271  
 Krein, M. G., viii, 73, 76  
 Krein–Gelfand–Lidskii theorem, 87
- Lagrange formula, 203  
 Lagrange’s stability theorem, 148  
 Lagrangian, 96  
 Lagrangian system, 96  
 Lamb, H., 26  
 Lancaster, P., 150  
 Lavrent’ev, M. A., 68  
 Levantovskii, L. V., 110  
 Leverrier, U., 36, 55  
 Leverrier–Barnett algorithm, 147, 177  
 Leverrier–Faddeev algorithm, 55  
 Lewin, M., 56  
 Lewin’s formula, 56  
 Lidskii, V. B., ix  
 Liénard–Chipart criterion, 61, 377  
 lineal, 72  
 linear stability, 3, 82  
 linearization, 43  
 Lippmann, G., 364  
 LRC circuit, 156  
 Lyapunov, A. M., 37  
 Lyapunov functions, 40  
 Lyapunov inequality, 44  
 Lyapunov matrix, 49  
 Lyapunov reducibility theorem, 50  
 Lyapunov regularity, 45  
 Lyapunov stability, 38, 82  
 Lyapunov theorem on stability, 41  
 Lyapunov theorem on uniform asymptotic stability, 41  
 Lyapunov transformation, 49  
 Lyusternik, L. A., ix
- MacKay, R. S., 67  
 MacKay’s eigenvalue cone, 13, 80, 310  
 MacKay’s formula, 189  
 Maddocks, J. H., 76  
 magnetic Prandtl number, 367  
 magneto-Coriolis wave, 371, 380  
 magnetohydrodynamics, 266  
 Malkin, I. G., 39  
 marginal stability, 3  
 matrix Lyapunov equation, 54  
 matrix polynomial, 3  
 Maxwell, J. C., 36  
 Merkin’s theorem, 29, 126, 165  
 Merkin, D. R., 165, 166  
 metamorphoses of the eigencurves, 134  
 MHD, 266  
 MHD dynamo, 68, 266  
 microwave cavity, 360  
 mixed Krein signature, 14, 77, 274  
 modulational instability, 19, 233  
 monochromatic wave, 19, 344  
 monodromy matrix, 50  
 motion, 37  
 Motzkin–Tausky theorem, 84  
 Müller, P. C., 56, 59  
 Müller’s formula, 56, 59  
 multiparameter eigenvalue problem, 53, 83, 91  
 multiplicity of the characteristic exponent, 44
- near-Hamiltonian system, 188  
 negative definite function, 40  
 negative energy mode, 27, 89, 175, 367  
 negative Krein signature, 76  
 negative semidefinite function, 40  
 Newton–Puiseux series, 208  
 Nicolai, E. L., 29, 128  
 Nicolai’s paradox, 29, 128  
 NLS, 19  
 NLS, dissipatively perturbed, 20  
 nonautonomous dynamical system, 39  
 noncommuting limits, 378  
 nonconservative forces, 25, 146  
 nonconservative positional forces, 97, 125, 295  
 nonderogatory eigenvalue, 66, 207

- nonderogatory matrix, 66  
 nonequilibrium thermodynamics, 97  
 nonholonomic systems, 98  
 nonlinear Schrödinger equation, 19  
 nonoscillatory instability, 201  
 nonselfadjoint boundary eigenvalue problem, 200, 204, 234  
 nonsemisimple 1 : 1 resonance, 6, 27, 78  
 nonsmooth and nonconvex optimization, 64  
 normal fundamental matrix, 44  
  
 observability index, 58  
 observability matrix, 58  
 Onsager, L., 97  
 optic axis, 331, 345  
 orthogonal projector, 72  
 oscillatory damped system, 146, 155  
 oscillatory instability, 98, 201  
 Ostrowski, A., 57  
 Ostrowski–Schneider inertia theorem, 58  
 overdamped system, 150  
 overlapping of eigencurves, 132  
  
 paradox of inductionless HMRI, 371  
 parametric resonance, 19  
 parity, 30  
 Parks, P. C., 59  
 partially follower force, 223  
 passing, 7, 78  
 Paul trap, 18  
 Pedersen, P., 200  
 periodic dynamical system, 39  
 Perron, O., 45  
 Perron’s regularity test, 45  
 Persidskii, K. P., 38  
 Persidskii theorem on uniform stability, 41  
 phase velocity, 344  
 Plücker, J., 32, 331  
 Plücker conoid, 32, 198, 379  
 Poincaré instability degree, 88, 148  
 point spectrum, 74  
 Pontryagin, L. S., viii, 74  
 Pontryagin space, 73  
 Pontryagin’s theorem, 74  
 positional forces, 146  
 positive definite function, 40  
 positive energy mode, 89, 175, 367  
 positive Krein signature, 76  
 positive semidefinite function, 40  
 potential energy, 88, 96  
 potential forces, 97, 146  
 potential forces of hyperbolic type, 97, 125  
 potential forces of spherical type, 97, 125  
 potential system, 146  
 Prandtl, L., 10  
 principal parametric resonance, 215, 310  
 principle of exchange of stabilities, 201, 268  
 PROMISE experiment, 370  
 pseudo-gyroscopic force, 97  
 $\mathcal{PT}$ -symmetry, 21, 31, 156  
  
 quadratic form, 72  
 quasilinear system, 43  
  
 Rabinovich, B. I., 67  
 Rankine, W. J. M., 10  
 Rayleigh quotient, 184  
 Rayleigh’s criterion, 365  
 Rayleigh’s theorem, 81, 148, 161  
 reducible system, 49  
 reflected wave, 91  
 regular perturbation, 205, 237  
 resolvent set, 73  
 resonance tongue, 216  
 Reut’s column, 227  
 reversible 1 : 1 resonance, 96  
 reversible Hopf bifurcation, 27, 96  
 reversible system, 95  
 rhodonea curve, 15  
 rigidity of a potential system, 148  
 Robin boundary conditions, 268  
 robust Hurwitz stability, 61  
 root element, 73  
 root lineal, 73  
 root subspace, 74  
 Rossby, K.-G. A., 369  
 Rossby number, 11, 369  
 rotating damping, 25, 171  
 rotating saddle trap, 6  
 Routh, E. J., 36

- Routh–Hurwitz criterion, 22, 60  
ruled surface, 62, 182, 329
- Saffman, P. G., 67  
Schneider, H., 57  
second Lyapunov instability theorem, 42  
secular term, 6  
selfadjoint boundary eigenvalue problem, 204  
selfadjoint operator, 72  
semisimple 1 : 1 resonance, 333  
semisimple eigenvalue, 7, 49, 78  
sensitivity analysis, 200, 201  
Seyranian, A. P., 110  
shimmy, 98  
shipwright’s circular wedge, 329  
Shkalikov, A. A., 72  
simple eigenvalue, 5  
singular axis, 348, 354  
slow precession, 176  
slowness surface, 346  
slowness vector, 346  
Smith, D. M., 12, 25  
Smith’s rotor, 25, 52  
Sobolev, S. L., viii, 68  
Sobolev’s top, 68  
soliton, 19  
spectral abscissa, 63, 64, 151  
spectral mesh, 200, 214, 273, 295  
spectral parameter, 3, 332  
spectral stability, 3, 165  
spectrum, 73  
splitting, 7, 78  
Spurr, R. T., 294  
stability by linearization, 43  
stability degree, 82  
stability diagram, 100  
standard MRI, 370  
Starzhinskii, V. M., 81  
state transition matrix, 44  
static instability, 5, 98  
stationary damping, 25, 171  
steady-state bifurcation, 78, 96, 148  
Stokes, G. G., 36  
strong stability, 86  
structural instability, 64, 233  
subcritical rotor speed, 296  
supercritical instability, 25  
supercritical rotor speed, 296  
swallowtail, 124, 154  
Sylvester criterion, 60  
symplectic matrix, 75  
symplectic signature, 14, 311
- Tait, P. G., 163  
tangent cone, 65, 110, 158, 169, 240  
Tellegen, B. D. H., 30, 345  
Thomson, W., 1, 36  
time reversal, 27, 30, 95, 356  
tippe-top, 185  
topological phase, 357, 359, 361  
transfer of instability between modes, 182, 243  
transport equations, 375  
transversal intersection, 112  
trapping, 5  
trihedral spike, 122, 153
- uniform asymptotic stability, 39  
uniform stability, 38  
uniformly attractive equilibrium, 39  
unperturbed motion, 37
- veering of eigencurves, 13, 80, 132, 133, 278
- Velikhov, E. P., viii, 364  
Velikhov–Chandrasekhar paradox, 367  
velocity-dependent forces, 146, 242  
versal deformation, 121  
Veselic, K., 162  
viaduct, 315, 340, 349  
Vishik, M. I., ix  
Volkmer, H., 266
- Walker, J. A., 168  
walking robot, 114  
Wallis, J., 329  
wave inertia effect, 11  
whirling, 10  
Whitney umbrella, 23, 28, 63, 154, 169, 174, 182, 233, 353  
Williamson’s normal form, 89  
Wimmer, H. K., 58, 149  
Wimmer’s theorem, 58  
Winkler elastic foundation, 217

- 
- Yakubovich, V. A., 81
- Zajac, E. E., 163
- Zevin, A. A., 82
- Zhuravlev, V. F., 161
- Ziegler, H., viii, 97, 128, 233
- Ziegler's paradox, 28, 168
- Ziegler's pendulum, 97, 139
- Ziegler's pendulum with a dash-pot, 259
- Ziegler's principle of maximum entropy production, 97
- Ziegler–Bottema destabilization paradox, 28, 97, 168, 188, 233, 262