## Index

A	
Algebraic Lyapunov Equation	pp.80 - 82
Asymptotically Stable	pp.7, 61 - 62, 67 - 69, 75
Attractiveness	pp.61,99
B	
Bendixson's Theorem	pp.25 - 29
Bifurcation	pp.12 - 13
Bifurcation (Fold)	pp.12 - 13,57
Bifurcation (Transcritical)	pp.12 - 15
Bifurcation Diagram	pp.12, 15 - 17
C	
Carrying Capacity	p.9
Center Manifold Theory	pp.39 - 45
Centers (Equilibrium Point)	pp.22, 26
Characteristic Equation	p.34
Class K (Comparison Functions)	pp.93 - 97, 102 - 112
Class K L (Comparison Functions)	pp.93 - 97, 102 - 112
Class $K_{\infty}$ (Comparison Functions)	pp.93 - 96, 105
Comparison Function	pp.93 - 96, 102 - 103
Continuity w.r.t. Initial Conditions	pp.53 - 55
Continuity w.r.t. Parameters	pp.54 - 55
Continuously Differentiable	pp.48 - 52
Controllability Gramian	p.80
Coordinate Transformation Matrix	pp.18, 20 - 41
D	
Diagonalization	p.79
Differentiable	pp.51 - 52
Divergence	pp.25 - 29
E	
Equilibrium Point	pp.3-4
Existence And Uniqueness Theorem	pp.46 - 52,91
F	
Finite Escape Time	pp.9 - 10
Focus Node	pp.22, 33
Fold Bifurcation	pp.12 - 13,57
G	
Geometric Series	p.92
Globally Asymptotically Stable	pp.62, 67
Green's Theorem	pp.25 - 27
H Colombia	22 24
Hartman Grobman Theorem	pp.23 - 24
Homeomorphic	p.23
Hopf Bifurcation	pp.35 - 38
Huber Function	p.71
Hurwitz Matrix	pp.81 - 82

Hyperbolic Equilibrium Point	pp.22-24
I	
Index Theory	p.35
Infinity Norm	p.61
Invariant Manifold	pp.42 - 45
Invariant Set	pp.74-77
J	
Jacobian	pp.56 - 58
L I November 1 Novembe	61
L1 Norm	p.61
L2 Norm	p.61
La Salle's Invariance Principle Level Sets	pp.74 - 77,85 - 87 pp.66 - 69
Limit Cycle	pp.00 - 09 pp.10 - 12, 33 - 38
Linearization at a Fixed Point	pp.10 - 12, 33 - 38 pp.5 - 8, 23 - 24, 88
Lipschitz Continuous Function	pp.3 - 8, 23 - 24, 88 pp.49 - 55, 91
Locally Asymptotically Stable	pp.49 - 55, 91 $pp.61 - 62, 67 - 69$
Logistic Equation	p.9
Lorenz Attractor	p.3 p.12
Lyapunov Functions	pp.65 - 87
Lyapunov Stability	pp.59 - 69, 106 - 112
M	pp.50 00,100 112
Manifolds, $C^k$ Differentiable	pp.48 - 52
Metzler Matrix	p.31
N	<i>p.</i> 01
Negative Semidefinite Function	pp.67, 74
Nesterov Acceleration	p.98
Node	pp.21, 33
0	** /
Observability	pp.86 - 87
Observability Gramian	p.80
P	
P Norm	p.61
Pendulum	pp.7 - 8,63 - 64,72 - 77
Periodic Orbits	pp.25 - 34
Phase Portrait	pp.5, 17-19
Pitchfork Bifurcation	pp.12, 15 - 17
Poincare Bendixson Criterion	pp.32 - 34
Positive Definite Function	pp.65 - 66
Positive Definite Matrix	pp.78 - 79
Positive Invariant Set	pp.21, 29 - 34, 69
Positive System	p.31
Predator/prey Model	pp.30 - 31
R	
Radially Unbounded	pp.67 - 68, 105 - 107
Region of Attraction	pp.15, 92 - 93
Routh Hurwitz Criterion	pp.34, 83

S	
Saddle Node	pp.19 - 21
Sector Bounded Nonlinearities	p.72
Sensitivity Function	pp.55 - 58
Sink Node	pp.19, 21
Source Node	pp.19, 21
Stability	pp.5, 98 - 103
Stability Via Linearization	pp.88 - 90
Stable	p.5
State Transition Matrix	pp.105 - 106
Subcritical Hopf Bifurcation	pp.37 - 38
Subcritical Pitchfork Bifurcation	p.17
Supercritical Hopf Bifurcation	pp.35 - 37
Supercritical Pitchfork Bifurcation	pp.15 - 16
Symmetric Matrix	p.78
T	
Taylor Series Expansion	pp.6, 39 - 40, 44 - 45
Transcritical Bifurcation	pp.12 - 15
U	
Uniformly Asymptotically Stable	pp.100 - 104, 107 - 112
Uniformly Exponentially Stable	pp.103 - 104, 107
Uniformly Stable	pp.100 - 102, 104, 107 - 112
Unitary Diagonal Coordinate Transformation	p.79
V	
Van Der Pol Oscillator	pp.11 - 12