

Index

Page numbers set in *italic* indicate figures and tables.

- Adaptation to changing markets, 38
- Algorithms:
 - derived from gambling literature, 91
 - genetic (GAs), 195–197
 - hill climbing search, 188–189
 - position sizing, 75
- Annualized rate of return, 203. *See also*
 - Pessimistic return on margin (PROM)
- Approach:
 - empirical development, 45–47
 - philosophical, to trading strategies, 44–47
 - scientific, 44–48
- Assumptions:
 - opening and closing range slippage, 115–117
 - realistic, 113–118
 - slippage due to size, 117
 - slippage, price and trade, 113–115
 - slippage, significance of, 117–118
- Asymmetrical trading strategy, 75
- Automation:
 - large-scale trading strategies, 69
 - advantages of, 32–33
 - Walk-Forward Analysis, 69–70, 247–248
- Back-testing, 57, 68
- Barclay Trading Group, 22
- Basket of markets:
 - multimarket and multiperiod test, 169–173, 170, 173–176, 223–225, 224
 - optimization framework, 223–225, 224
 - testing, 172–173, 173–176
- Bear market, the, 134, 134, 135, 221
- Black swan events, 119, 264
- Buffet, Warren, 19
- Bull market, the, 132, 133, 221
- Buy-and-sell conditions, 75. *See also*
 - Entry and exit strategies
- Buy Market If Touched (MIT) orders, 115
- Buy (or long) rules, 77
- Buy price limit orders, 115
- Buy stop orders, 114
- Capital:
 - overcapitalization, 266
 - performance profile, 35–36
 - portfolio risk management, 84–85
 - required (RC), 83–84, 270–272
 - risk, amount of, 36
 - stop-loss strategy, 305–308
 - trading, calculation of, 270–272
 - undercapitalization, 270–272
- Cash markets, 120
- C code, 152
- Collins, Art, 3
- Confidence:
 - overconfidence, 302
 - portfolio risk management, 85
 - robust strategy, 276
 - value of, for traders, 40, 268–269
- Congested market, the, 137, 137, 221

- Consistency, 29–31, 129–130, 276–277
- Contract:
 - continuous, 124–126
 - futures market, 118, 121–124, 122
 - limit moves, 118
 - perpetual, 124–125, 125
- Convergence of parameter sets, 196
- Correlation coefficient:
 - closing prices, 170–171
 - formula for, perfect profit and equity curve (CECPP), 204–205
- Countertrending systems, 111–112
- Crossover:
 - moving average system, 214–216
 - parameter sets, 196
- Curve-fitting. *See* Overfitting
- Currency market, the, 246
- Cyclic market, the, 135, 136

- Daily trading limits, 118
- Data:
 - degrees of freedom, 292
 - historical simulation, 33
 - relevant, theory of, 243–245
 - sample, for optimization framework 220–222
 - samples, 293–299
 - test window, 127
- Debugging, 61
- Degrees of freedom, 130–131, 221, 291–295
- Dennis, Richard, 5, 20, 141
- D.E. Shaw and Company, 7
- Distributions:
 - non-Gaussian, 89
 - optimization profile, 229–231, 229, 230
 - profit and loss, 277–280, 278, 279
- Dollar profit target, 88
- Dollar risk stop, 81
- Double-blind testing. *See* Out-of-sample testing
- Donchian, Richard, 20
- Drawdown, maximum (MDD), 83, 253, 265–272

- EasyLanguage, 50, 58, 61, 61, 153, 153–155
- Edge, definition of, 17
- Efficiency, Model (ME), 273–276, 275
- Efficient Market Hypothesis (EMH), 137–140
- Empirical approach, 45–47, 242–243, 254
- Entry and exit strategies, 74–79
- Equity:
 - curve, the, 107, 107, 108, 204–205
 - correlation coefficient, formula for, of perfect profit and equity curve (CECPP), 204–205
 - high to low, and risk, 265
 - maximum drawdown (MDD), 267–268
- Evaluation:
 - annualized rate of return, 203
 - compared with trade profile, 310–311
 - equity curve, the, 204–205
 - maximum drawdown (MDD), 203–204
 - net profit, 201–203
 - optimization framework, 222–223, 231
 - perfect profit, 204–205
 - performance criterion, 203–208
 - pessimistic return on margin (PROM), 205–208
 - profile, 309–310, 313
 - profit and risk, 223–225, 224
 - real-time performance, 54–55, 308–310
 - time-sliced, 241–242
 - Walk-Forward Analysis, 248–250, 261
- Event trading, 118–120, 268–269
- Expectations:
 - positive, and accurate historical simulation, 34
 - theoretical, 164, 164–166
- Extensibility, definition of, 32

- Fama, Eugene, 137
 Farmer, Doyne, 7
 Financial time series, 266–267
 Fit, definition of, 282. *See also*
 Overfitting
 Fitness function. *See* Objective
 function
 Flat production, 316–317
 Forecasting model, overfit, 286–289
 Fractal geometry (Mandelbrot), 267
 Freedom, degrees of. *See* Degrees of
 Freedom
 Function, objective. *See* Objective
 function
 Futures market:
 adjusted continuous contract,
 124–125, 125
 dimension of risk, 264
 life cycles of contracts, 121–124, 122
 perpetual contract, 124–125
 rollover gap, 123–124
 Gann, W.D., 23–24, 40, 82
 Genetic algorithms (GAs), 195–197
 Global optimum of parameter sets, 196
 Good Till Canceled (GTC) order:
 opening gap slippage, 115–116
 profit target orders, 88
 risk stop, 81
 trailing stop, 87
 Graphic displays:
 equity curve, the, 107, 107, 108
 of trading strategy, 62, 64
 Greed, and negative effects on trading,
 28
 Grid search, 181–185, 183
 Gross profit and pessimistic return on
 margin (PROM), 205–208
 Hill climbing:
 mutipoint search, 189–190, 190–192
 search algorithms, 188–189
 Hindsight, abuse of, 284–286
 Historical simulation:
 accuracy, 109
 assumptions, realistic, 113–118
 bar-by-bar reporting, 64, 65–67,
 91–92
 cash markets, 120
 data, 120
 development cycle, 226
 equity curve, the, 107, 107, 108
 expectations, theoretical, 164,
 164–166
 futures markets, 121–124
 grid search, 181–185, 183
 life cycle of trading strategy, 140–141
 limit moves, 118
 major events and dates, 118–120,
 268–269
 markets, types of, 132–137, 133–137
 multimarket and multiperiod test,
 169–177, 170, 173–176
 model parameter combinations,
 51–52
 optimization profile, 227
 out-of-sample data, 250–251
 price data, 3, 33, 93
 performance summary, 94, 95
 period, length of, 171
 phantom trades, 111–112
 and positive expectancy, 34
 realistic assumptions, 113–118
 reports, essential, 94–107
 rounding issues, 109–111
 sample size, 127–128, 295
 scan range, 218–220
 simple optimization, example,
 214–216
 slippage, 113–118
 software limitations, 109–112,
 109–113
 stability. *See also* Consistency,
 129–130
 standard error, 127–128
 test window, defined, 126
 trade list, the, 94, 96–106, 107
 trades, number of, 129
 trading window, 250
 use with preliminary testing, 159
 Walk-Forward Analysis, 93, 250
 Hite, Larry, 158

- Intelligence, artificial, *versus* human, 44, 46
- In-sample optimization, 253. *See also* Out-of-sample; Postoptimization
- Interval-by-interval reports, 62
- Jones, Paul Tudor, 19
- Kaufman, Perry, 1, 113
- Kelley method, the, 90–91
- Kovner, Bruce, 19
- Language, scripting. *See* Scripting language
- Limit moves, 118
- Liquidity of market, 246
- Local maximum, 199–200, 200
- London Stock Exchange, 120
- Long-Term Capital Management, 138
- Mandelbrot, Benoit, 267
- Market on Close (MOC) orders, 116–117
- Market on Open (MOO) orders, 117
- Market opportunities (inefficiencies), 138–140
- Market orders, 114
- Markets:
- adverse, 226
 - agricultural, 245
 - bear, the, 134, 134, 135, 246
 - bull, the, 132, 133, 246
 - cash, 120
 - changing, 37–38, 241–242
 - congested, the, 137, 137
 - currency, 246
 - cyclic, the, 135, 136
 - daily limits, 264
 - efficient, 138, 245
 - extensibility of, 32–33
 - financial, 246
 - free open-outcry *versus* electronic, 138
 - futures, 7, 118, 121–124, 122, 264
 - liquid, 246
 - locked-limit, 264
 - predictive, 288
 - traders, various types in, 139
 - trend-following, 41, 165–166, 246
 - types of, and optimization framework, 221
 - unusual, 165–166
 - volatility, 37–38, 81, 86, 89–90
- Market trends, 37–39, 41, 165–166, 246
- Market Wizards* (Schwager), 158
- Martingale and anti-Martingale position sizing, 90
- Maximum drawdown (MDD), 203–204, 265–272
- Maximum risk, 305–308
- Mental aspects of trading, 302–303
- Metastock, 50, 58, 153–154
- Model efficiency (ME), 273–276, 275
- Moving average crossover system: simple optimization, 214–216 grid search, 181–185, 183
- Multimarket and multiperiod tests, 169–173, 169–177, 170, 173–176
- NASDAQ, 246
- Net profit evaluation, 201–203, 203, 205–208
- New York Stock Exchange, 120
- Objective function: evaluation method, 201–203 example of, in Walk-Forward Analysis, 250 genetic optimization algorithm, 197 importance of, 68 optimization function, 12–13 optimization space, 201 parameter set, 201–202 particle swarm optimization (PSO), 197–198 search methods, 180–200 search parameters, 12–13 selecting for optimization framework, 222
- Sharpe Ratio, 201, 212
- speed of processing, 185
- strategy parameters, 179–180

- Objectivity:
 - definition of, 27
 - value of, for trading, 27–29
- Omega Research (custom programming), 2
- Opening and closing range slippage, 115–117
- Optimal f (fixed fractional trading), 90
- Optimization:
 - versus* curve-fitting, 51
 - definition of, 37
 - degrees of freedom, 130–131
 - distribution of profile, 229–231, 229, 230
 - drawdown, maximum (MDD), 253
 - errors, 296–298
 - evaluation, 222–223, 225
 - example of, in Walk-Forward Analysis, 250
 - framework, 216–223, 217
 - function, 12–13
 - global maximum, 199, 199
 - historical trading performances, 51–52
 - model parameter combinations, 51–52
 - moving average crossover system, 214–216
 - multimarket and multiperiod, 223–225, 224
 - overfitting, 8, 213–214, 233
 - overparameterization, 296
 - overscanning, 237
 - pitfalls, 213–214
 - postoptimization (out-of-sample), 52–53, 250–251
 - profile, 227–229, 229, 234
 - reoptimization, 243, 254
 - robust trading strategy, 202, 225–227
 - shape of profile, 231–235, 232, 233
 - simple, example, 214–216
 - simulated annealing (SA) method, 193–195
 - trading strategy, 51–52
 - and Walk-Forward Analysis, 237–261
 - window, 242–243
- Optimization space
 - dimensions of, 184
 - enlightened or informed selectivity, 188–189
 - hill climbing, multipoint search, 189–190, 190–192
 - peaks and valleys, 200, 200
 - search for, 179–209
- Orders:
 - buy and sell, 76–77 (*see also* entry and exit strategies)
 - buy Market If Touched (MIT) orders, 115
 - buy price limit orders, 115
 - buy stop, 114
 - calculations and testing, 159, 160
 - countertrending systems, 111–112
 - dollar profit target, 88
 - Good Till Canceled (GTC), 81, 115–116
 - Market on Close (MOC), 116–117
 - Market on Open (MOO), 117
 - market order, 114
 - opening gap, 115–116
 - overnight risk, 80–81, 87
 - price (or limit) orders, 111–113
 - profit target, 87–88
 - sell Market If Touched (MIT) orders, 115
 - sell price limit orders, 115
 - sell stop, 114
 - slippage, 80–81, 113–118
 - Stop Close Only (SCO), 116–117
 - stop-loss, 76, 80
 - target, 76
 - trailing dollar profit stop, 86
 - trailing volatility profit stop, 81, 86
 - volatility profit target, 88
- Out-of-sample testing, 52–53, 237, 241, 247, 250–251
- Overcapitalization, 266
- Overfitting:
 - abuse of hindsight, 284–286
 - big fish in small pond syndrome, 296
 - causes of, 282–284, 291–299
 - cure for, 239–240

- Overfitting: (*Continued*)
versus curve-fitting, 281–282
degrees of freedom, 253, 291–295
entry and exit filters, 79
forecasting model, example,
286–288
versus optimization, 8, 14
spiky performance profile, 233–234,
233
strategy design, 74
symptoms of, in trading model,
290–291
trading model, example, 289–290
Walk-Forward Analysis, 253,
298–299
- Overparameterization, 296
- Overscanning, 297–298
- Parameters:
constant, 216
convergence, 196
crossover, 196
definition of, 212
distribution in optimization
framework, 229–231, 229, 230
enlightened or informed selectivity,
188–189
genetic algorithms (GAs), 195–197
grid search, 181–185, 183
historical price data, 51–52
mutation of sets, 196
optimization framework, 216–220,
228
particle swarm optimization (PSO),
197–198
periodic reoptimization, 223
population, 195
prioritized step search, 185–188
reoptimization, 243, 254
robustness, 222–223
scan range, in framework, 218–220
selection through generations, 195
set, best for trading, 242–243
Sharpe Ratio, 201, 212
simulated annealing (SA) method,
193–195
testing, 217–218
top, 212
Walk-Forward Analysis, 247–248
- Particle swarm optimization (PSO),
197–198
- Patterns of profit and loss, 277–280,
278, 279
- Perfect profit (PP), 204–205, 273–276,
275
- Performance:
evaluation, 201–203
market changes, 241–242
overfitting, 240
peak, 243
period, 108, 108
postoptimization, 251
preliminary testing, 166–169, 167,
168
profile, 26–27, 35
quirks, 313–315, 313, 314
real-time trading, 253, 270, 302
smooth profile, in pivot chart, 232
spike, in pivot chart, 233
statistical rigor, 244–245
summary, 94–107, 95
summary, example, 25–26
time-sliced trading, 241–242
trading strategy, 26–27
underperformance, 266
- Pessimistic return on margin (PROM),
205–208
- Phantom trades, 111–112
- Pickens, T. Boone, 19
- Portfolio:
maximum drawdown (MDD),
84–85
measurement of risk, 27
risk management, 84–85
Walk-Forward Analysis, 261
- Position sizing:
advanced strategies, 91, 91–92
algorithms, derived from gambling
literature, 91
entry and exit strategies, 75
importance in trading strategy,
89–91

- optimal f (fixed fractional trading), 90
- overnight, open, 265
- reversal *versus* nonreversal rules, 77–78
- scaling into and out of a position, 91–92
- too large *versus* too small, 89
- volatility adjusted, 89–90
- Postoptimization (out-of-sample), 52–53, 237, 241
- Prediction Company, The, 7
- Price and trade slippage, 113–115
- Price data, historical, 3, 33, 51–52, 93
- Price (or limit) orders, 111–113
- Price shock, 267–268
- Prioritized step search, 185–188
- Profile:
 - distribution of the optimization, 229–231, 229
 - profit and risk, 253
 - shape of the optimization, 231–235, 232, 233, 234
 - statistically significant optimization, 227–229, 229
 - test, understanding, 311–313, 313
- Profit. *See also* Profit, perfect (PP)
 - dollar profit target, 88
 - management of, 85–88
 - patterns of, and loss, 277–280, 278, 279
 - perfect (PP), 204
 - portfolio risk management, 85
 - potential, 274
 - price order, 76
 - real-time trading, 237, 238
 - risk, interrelated with, 26, 253
 - risk-adjusted rate of return (RAR), 272–273
 - targets, 76, 87–88
 - trailing dollar profit stop, 86
 - trailing stop, the, 76, 85–86
 - trailing volatility profit stop, 86
 - volatility profit target, 88
 - Walk-Forward Analysis, 34–35
 - windfall, 268, 315–316
- Profit, perfect:
 - correlation coefficient, formula for, of perfect profit and equity curve (CECPP), 204–205
 - definition of, 21
 - table of daily data, 21
- Programming:
 - analyzing, 61, 61
 - C code, example, 152
 - diagnostics, 59–61
 - “if” statement, 155
 - interview process, 147–151
 - pseudocoding, 146, 146–147, 151–155
 - specifications, 151–155
 - scripting language, 58
 - testing, 157–177
- Psychology of traders, 27–29, 30–31
- Quantification and trading advantages, 27
- Quote vendors, real-time, 2
- Real-time performance, 54–55, 308–310
- Real-time trading:
 - consistency, 29–31
 - evaluation and trade profile, 310–311
 - versus* historical simulation, 39
 - optimization, 212, 226
 - overfitting and losses, 283
 - performance profile, 36–37
 - profits, 226
 - return on investment, 303–305
 - signals, 62
 - and Walk-Forward Analysis, 39, 53
- Renaissance Technologies, 7, 21
- Reoptimization, 243, 254
- Reports:
 - equity curve, the, 107, 107, 108
 - graphic display, 62, 64
 - historical bar-by-bar basis, 64, 65–67
 - interval-by-interval basis, 62
 - performance summary, 62
 - trade-by-trade basis, 62, 63–64
 - time-sliced, 254

- Reports: (*Continued*)
 trade list, the, 94, 96–105, 107, 161, 161–163
 year-by-year basis, 108, 108
- Required capital (RC), 83, 270–273
- Returns:
 annualized rate of, 203
 potential of, 22
 reliable measure of, and return, 241
 risk-adjusted rate of return (RAR), 24, 26, 27, 272–273
- Reward to risk ratio (RRR), 273
- Risk:
 -adjusted rate of return, 272–273
 dimension of, 264
 entry and exit signals, 75
 future trading, 27
 management, 81–82
 maximum, 305–308
 maximum drawdown (MDD), 83, 261, 265–272
 maximum potential, 266
 moving target, 31
 net profit evaluation, 201–203
 overnight risk, 80, 80–81, 87, 264, 265
 portfolio, 84–85
 profit, interrelated with, 26
 reliable measurements, 27
 required capital (RC), 83–84
 risk stop, 80
 slippage, 80, 80–81
 stop, 80
 stop-loss signals, 75–76
 strategy design, 74–75, 82–84
 target orders, 88
 three broad categories, 79
 trade risk, 80–82, 265–272
 trailing dollar profit stop, 86
 trailing volatility profit stop, 86
 volatility risk stop, 80–81
- Robustness:
 four features of, 158
versus profitability, 202, 202–203
- Rounding issues, 109–111
- Rule of Ten, 82
- Rules:
 -adjusted position sizing, 89–90
 diagnostics, 61, 61
 optimization, 51–52
 Martingale strategy, 90
 optimal f (fixed fractional trading), 90
 position sizing, 89–91
 sell (or short), 77
 specifications for programming, 151–155
 trading, 159, 161, 161–163, 164
- Scaling into and out of a position, 91–92
- Scholes, Myron, 138
- Schwager, Jack, *Market Wizards*, 158
- Scripting language:
 EasyLanguage, example, 153–155
 “if” statement, 155
 Metastock, example, 153–154
 pseudocoding, 146
 TradersStudio, example, 154–155
 wizard, 58
- Search:
 advanced methods, 191–200
 evaluation method, 201–203
 global maximum, 199, 199–199
 grid search, 181–185, 183
 hill climbing, multipoint search, 189–190, 190–192
 hill climbing search algorithms, 188–189
 local maximum, 199–200, 200
 methods, 180–200
 optimization space, 179–180
 parameter, 12–13
 particle swarm optimization (PSO), 197–198
 peaks and valleys, 200, 200
 prioritized step search, 185–188
 problems, general, 198–200, 199–200
 simulated annealing (SA), 193–195

- Selectivity, enlightened or informed, 188–189
- Self-doubt, and negative effects on trading, 28–29
- Sell Market If Touched (MIT) orders, 115
- Sell price limit orders, 115
- Sell stop orders, 114
- Sharpe Ratio, 201, 212
- Shaw, David, 7
- Shifting markets, 245
- Signals:
- filters for entry and exit, 78–79
 - price chart for testing, 59, 59
 - real-time, 62
 - stop-loss, 75–76
- Simons, Jim, 7
- Simulated annealing (SA) optimization method, 193–195
- Simulation:
- definition of, 33
 - historical, 33
- Sizing. *See* Position sizing
- Slippage, 80, 113–120, 123–124
- Software:
- advances in, 6–7
 - automated trading, advantages of, 32–33
 - CQG (custom programming), 2
 - curve, closeness of fit *versus* predictive capacity, 214
 - limitations, 109–112
 - Omega Research (custom programming), 2
 - phantom trades, 111–112
 - price orders, 112–113
 - reports, 63–67
 - rounding issues, 109–111
 - tick math, 110–111
- Specifications:
- ideas, vague *vs.* precise, 150–155
 - sample interview, 49–50, 147–150
- Standard and Poor's 500 Futures, 120, 264
- Startup overhead, 293–295
- Statistics:
- correlation coefficient, 170–171
 - degrees of freedom, 130–131, 221, 291–295
 - measurements, standard, 266–267
 - modeling procedures, 288
 - rigor of, 244–245
 - robust, 267
 - sample size, 127–128
 - standard error in sample size, 293–296, 295, 296
 - test window, 127
- Stop-loss strategy, 305–308
- Stop Close Only (SCO), 116–117
- Strategy. *See* Trading strategy
- Strategy design. *See* Trading strategy design
- Strategy development. *See* Trading strategy development
- Symmetrical trading strategy, 75
- Target order: 76
- Technology. *See also* Software
- automated trading, advantages of, 32–33
 - correlation coefficient, closing prices, 170–171
 - detecting bad trading ideas, 301
 - diagnostics, 59, 59–60, 61
 - growth of, 6
 - market opportunities (inefficiencies), 139–140
 - objective function, 68
 - optimization framework, 218–220
 - reporting, 62, 63–64, 64, 65–67
 - shifting markets, 245
 - simple optimization, example, 214–216
 - software limitations, 109–112
 - specifying rules, example, 151–155
 - trading strategies, large-scale, 69
 - versus* scientific and empirical method, 46–47
 - Walk-Forward Analysis, 69–70, 247–248
- Templates, 58

- Testing:
 - back-testing, 57
 - computerized, 7–8
 - historical simulation, 159, 172–173, 173–176
 - multimarket and multiperiod, 169–177, 170, 173–176
 - out-of-sample, 247
 - performance, 166–169, 167, 168
 - period, length of, 171
 - platforms used for development, 49–50, 57
 - preliminary, 50–51, 157–177
 - procedures, benefits of, 8
 - results, 174–176, 177
 - software, 6–7
 - trading strategy, 173, 173–176, 177
- Test window:
 - degrees of freedom, 130–131
 - scan ranges, 249
 - size of, 141–144, 143, 144
 - trading, frequency of, 131–132
- Thorpe, Professor Edward, 90
- Tick math, 109–111
- Time-period-by-time-period analysis, 242
- Time-sliced trading performance, 241–242
- Trade-by-trade report, 62, 65
- Trade, definition of, 17
- Trade list, the, 94, 96–105, 107, 161, 161–163
- Traders:
 - common mistakes, 146
 - confidence, 40–41
 - discretionary, 18–19, 19–21
 - effects of emotions on, 28–29
 - versus* individual investor, 6
 - interview with programmer, 147–151
 - maximum drawdown, 268–269
 - maximum runup, 269
 - portfolio analysis, 70–71
 - professional, 6
 - psychology of, 27–29, 168–269, 302–303
 - systematic, 9
 - value of objectivity, 27–29
- TradersStudio, 50, 58, 62, 63
- Trade size:
 - consistency, 31
 - historical sample, 220–222
- TradeStation, 50, 59, 60, 61, 70, 153, 153–155
- Trading:
 - discretionary, 9
 - futures, 7
 - optimization, 37
 - performance, peak, 37–38, 243
 - risk and margin, 265–272
- Trading models:
 - overfitting, example, 289–290
 - pessimistic return on margin (PROM), 208
 - statistical procedures, 288
 - symptoms of overfit, 290–291
- Trading profile:
 - evaluation of real-time trading, 308–311
 - expectations, theoretical, 165
- Trading strategy:
 - adaptation to markets, 38, 245
 - adhering to system, 51–52, 53–54
 - alternatives, 264–265
 - automated, benefits of, 9
 - benefits of, 38–39
 - confidence, 40–41
 - consistency of, 29–31, 129–130, 276–277
 - definition of, 17
 - development of, 43–55, 236
 - distribution, 277
 - drawdown, maximum (MDD), and risk, 83–85, 253–254, 265–272
 - examples of, 26
 - expectations, theoretical, 164, 164–166
 - expenses, 265
 - extensibility of, 32–33
 - formulation, 145–147
 - historical simulation, 172–173, 173–176
 - improving, 55
 - life cycle of, 140–141
 - market conditions, unseen, 304–305

- market contraction, 303–304
- market opportunities
 - (inefficiencies), 138–140
- mental aspects of, 302–303
- optimization framework, 216–222
- optimization profile, 227–235
- parameters, multiple, 192–193
- pessimistic return on margin (PROM), 205–208
- pitfalls of optimization, 213–214
- poor, 303
- portfolio maximum drawdown, 84–85
- portfolio risk management, 84–85
- profit and risk measurements, 24
- reasons for, 18–22
- reversal *versus* nonreversal rules, 77–78
- real-time, 308–310
- risk, 82–84
- robust *versus* profitability, 202–203
- robustness, 225–227, 238–239
- rules of, 49–50
- rules for entry and exit, 76–78
- search methods, advanced, 191–198
- shifting markets, adapting to, 245
- signals, 74–75
- specifications, 147–150
- stop-loss (SSL), 305–308
- superior alternatives, 305
- testing, 52–53, 157–177
- trades, number of, 129
- trailing stop, 76, 85–86
- trend-following, 165–166
- unsuccessful, 284–286
- validity, 252–253
- value of consistency, 29–31
- value of objectivity, 27–29
- Walk-Forward Analysis, 52–53, 237–253
- Trading strategy design, 73–75
- Trading strategy development:
 - abuse of hindsight, 284–286
 - back-testing, 57
 - eight stages, 47–49
 - entry and exit, 74–75, 78–79
 - formulation, 145–147
 - philosophical approaches, 44–47
 - rules of, 49–50
 - specifications, 147–150
 - scientific method, 48
 - testing platforms, 49–50
 - three major components, 74
- Trading systems, classic, 73
- Trading volume, global, 6
- Trading window, size of, 141–144, 143, 144
- Trailing dollar profit stop, 86
- Trailing stop, 76, 85–87
- Trailing volatility profit stop, 86
- Trend changes, 241
- Turtle Trading Strategy (TTS), 3, 20, 141
- Undercapitalization, 270–272
- Underperformance, 266
- Values:
 - optimization, 37
 - robustness of trading strategy, 37
- Verification:
 - calculations and trades, 158–159, 160, 161, 161–162, 164
 - definition of, 22
 - preliminary testing, 157–177
 - trading advantage, 24
- Vince, Ralph, 90
- Volatility:
 - adjusted position sizing, 89–90
 - cyclic component, 246
 - futures market, 121–124, 122
 - high, 274
 - markets, 37–38
 - risk stop, 81–82
 - Walk-Forward Analysis, 241–242
- Walk-Forward Analysis (WFA):
 - automation, 69–70, 247–248
 - cure for overfitting, 239–240
 - degrees of freedom, 244
 - empirical approach to trading, 46–47, 242–243, 254
 - example of, 250–256, 252, 257–260

Walk-Forward Analysis (WFA)
(Continued)
life cycle of trading strategy,
140–141
markets, 241–242, 245–247
objective function, 68
out-of-sample testing, 247
parameter set for trading, 242–243
peak performance, 243
postoptimization trading, 241
process, two-step, 247
real-time trading, 39, 237, 254
relevant data, theory of,
243–245
reoptimization, pre-emptive, 254

risk and return, reliable measures,
241
rolling optimization, 38–39, 244–245
startup overhead, 294–295
test, 52–53
time-period-by-time-period, 242
window, test, 141–144, 143, 144,
242–245, 250–251, 254
Walk-Forward Efficiency (WFE),
238–239, 254, 260–261
Williams, Larry, 302
Windfall profit, 119, 268, 269, 315
Window, 242–243, 250–251, 254
Year-by-year basis report, 108, 108

<http://www.pbookshop.com>

<http://www.pbookshop.com>

<http://www.pbookshop.com>

<http://www.pbookshop.com>

<http://www.pbookshop.com>