Contents

Pr	ologue: Models, concrete and wooden shoes	vii
1	The forms of change	1
	Thinking about change and development	1
	Iterates in space	14
	Notes	30
2	Developmental paths and systems	31
	The paths of change	31
	Cyclical transitory paths	38
	States and transitions	45
	The many faces of dynamic systems	49
	The topological forms of dynamic systems	56
	Developmental theories and dynamic systems	61
3	Observing and measuring dynamic processes	66
	Errors, mistakes and failures of observation	66
	Investigation as communication	76
	The science of change and difference	78
	Model and reality	85
	Notes	94
4	The dynamic growth model	95
	The growth metaphor	95
	The basic growth model	98
	Properties of the logistic growth equation	102
	Properties of growth in mental and behavioural development	107
	Modelling real growth	115
	Notes	124

vi Contents

5	Transitions and developmental fractals	125
	Transitions and sudden changes	125
	Fractals and self-similarity in development	130
	Fractal development and the quantity of transitions	135
	A mathematical model of transitions	140
	Transitions as catastrophes	145
	Notes	152
6	Oscillations	153
	Oscillations in development	153
	The well model	159
	From credit cards to predators	163
	Notes	177
7	Connected growers	178
	Development and uncertainty	178
	Some basic mathematics of connected growth and development	187
	The unexpected complexity of simple reciprocal dynamics	195
	Notes	212
8	Building a model: a case history	213
	The first steps	213
	Foundations for model building	216
	The characteristic data pattern and the dynamic building block	220
	Building the model	228
	Notes	241
9	The dynamics of mutual interaction	242
	Development as a social process	242
	The unexpected complexity of a simple mutualist dynamics	247
	Social interaction and the management of the carrying capacity	255
	Vygotsky's dynamic systems	262
Eį	oilogue: Towards an experimental theoretical developmental	
	psychology	271
	Unsolved problems abound	27
	Towards an experimental theoretical developmental psychology	276
Re	eferences	278
In	day	28