

1. Record Nr.	UNINA9910825249903321
Autore	Singh Phool
Titolo	Modeling crop production systems : principles and application / / Phool Singh
Pubbl/distr/stampa	Enfield, (NH), : Science Publishers, c2008
ISBN	1-57808-641-8
Edizione	[1st ed.]
Descrizione fisica	1 online resource (534 p.)
Disciplina	631.501/5118
Soggetti	Food crops - Mathematical models Agricultural systems - Mathematical models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Half Title -- Title Page -- Copyright Page -- Dedication -- Preface -- Contents -- 1. PHILOSOPHY, ROLE AND TERMINOLOGY OF SYSTEM SCIENCE -- 1.1 History of system science -- 1.1.1 Infancy -- 1.1.2 Juvenile phase -- 1.1.3 Adolescence -- 1.1.4 Maturity -- 1.2 General topology and terminology of systems -- 1.2.1 Variable -- 1.2.2 Parameter -- 1.2.3 System -- 1.2.4 Dynamic process/ model /system -- 1.2.5 Continuous versus discrete state spaces -- 1.2.6 Stochastic versus deterministic descriptions -- 1.2.6.1 Stochastic models of exponential growth -- 1.2.7 Modeling -- 1.2.8 Model -- 1.2.9 Steps in modeling -- 1.2.9.1 First Step: Define the problem -- 1.2.9.2 Second Step: Component identification -- 1.2.9.3 Third Step: Specify component behavior -- 1.2.9.4 Fourth Step: Computer implementation -- 1.2.9.5 Fifth Step: Validation -- 1.2.9.6 Sixth Step: Analysis -- 1.2.9.6.1 Sensitivity analyses -- 1.2.9.6.2 Stability analyses -- 1.3 Three problems -- 1.3.1 System management problem -- 1.3.2 Pure research problem -- 1.3.3 System design problem -- References -- 2. DEVELOPMENT OF MODEL STRUCTURE -- 2.1 Variables and their classification -- 2.1.1 Individual observations -- 2.1.2 Sample of observations -- 2.1.3 Variables -- 2.1.4 Population -- 2.1.5 Variables and their classification -- 2.1.5.1 Measurement variables -- 2.1.5.2 Discontinuous variables -- 2.1.6 Ranked variables -- 2.1.7 Nominal variables or attributes -- 2.1.8 Variate -- 2.1.9 Derived variable -- 2.1.10 Interval variable -- 2.1.11 Ratio variable -- 2.1.12 Rate-quantity

variable -- 2.1.13 Example -- 2.1.13.1 Components -- 2.1.13.1.1  
Person -- 2.1.13.1.2 Car -- 2.1.13.1.3 Highway -- 2.1.13.1.4  
Environment -- 2.1.14 Exercise -- 2.2 Relationship between variables  
-- 2.2.1 Causal loop diagrams -- 2.2.1.1 Direct relations -- 2.2.1.2  
Indirect relations.  
2.2.1.3 Relationship between rate and quantity variable -- 2.2.2 Types  
of relationship between variables -- 2.2.2.1 Direct (together) relations  
-- 2.2.2.2 Inverse relations -- 2.2.2.3 Indeterminate relations --  
2.2.2.4 Feedback relationship -- 2.2.3 Example of public address  
system -- 2.2.3.1 Step 1 -- 2.2.3.2 Step 2. Qualitative description of  
the system -- 2.2.3.3 Step 3. Definition of relevant components,  
subsystems, and interactions -- 2.2.3.4 Step 4. Definition of relevant  
variables -- 2.2.3.5 Step 5. Representation of the relations between the  
variables -- 2.2.3.6 Step 6. Description of the subsystems -- 2.2.3.7  
Step 7. The model equations -- 2.2.3.8 Step 8. Studying the behaviour  
of the mode] -- 2.2.3.9 Example of feedback relationship: Simple  
public address system -- 2.2.3.10 Example: Amplifier circuit with  
negative feedback -- 2.2.3.11 Effect of feedback on response to  
change in input -- 2.3 Structural (black box) model -- 2.4 Refinement  
in structural models -- 2.4.1 The structure of crop simulation models  
-- References -- 3. SPECIFICATION OF COMPONENT BEHAVIOR -- 3.1  
Algebraic form -- 3.1.1 Matrix algebraic form for studying a specific  
behavior of components -- 3.1.1.1 Use of matrix algebra in principal  
component analysis -- 3.1.1.2 Use of matrix algebra in linear  
programming for optimization of the system -- 3.1.1.2.1 Remark --  
3.1.1.3 Use of matrix algebra for distance measurements -- 3.1.1.3.1  
Calculation of group distances to make a dendogram -- 3.2 Integral-  
differential form -- 3.2.1 Example for formulating a differential  
equations -- 3.2.2 The absorption law of Lambert -- 3.3 Parameter  
estimation -- 3.3.1 Statistical procedure -- 3.3.1.1 Finding the best  
parameter values for linear equations -- 3.3.1.1.1 Useful characteristic  
of extrema -- 3.3.1.1.2 Expressions for parameters a and b.  
3.3.1.1.2.1 Derivative of a function of a function: The chain rule --  
3.3.1.1.2.2 Graphical representation -- 3.3.1.2 How good is the best  
fitting curve -- 3.3.1.3 Random versus systematic deviations -- 3.3.1.4  
Linear approximations for quick estimating a good fitting curve --  
3.3.1.5 Weighing of data -- 3.3.1.5.1 Example -- 3.3.1.6 Error due to  
data transformation -- 3.3.1.6.1 Example: Error due to data  
transformation -- 3.3.1.6.1.1 Graphical representation -- 3.3.1.7  
Correlation between variables -- 3.3.1.7.1 Example -- 3.3.1.8 Forced  
correlation -- 3.3.1.8.1 Example -- 3.3.1.9 Statistical procedure for  
parameters estimation of normal distribution curve -- 3.3.1.9.1  
Practical uses of normal distribution curve and table of normal  
distribution (double tail) -- 3.3.1.9.1.1 Example (Quirin 1978) --  
3.3.1.9.1.2 Example (Quirin 1978) -- 3.3.1.9.1.3 Differences between  
two population mean or proportions -- 3.3.1.9.1.4 Interval estimation  
-- 3.3.1.10 Parameter estimation of samples and the universe of  
discourse -- 3.3.1.11 Parameter estimation and hypothesis testing --  
3.3.1.11.1 Example (1) -- 3.3.1.11.2 Example (2) -- 3.3.1.11.3  
Example (3) -- 3.3.1.11.4 Example (4) -- 3.3.1.11.5 Example (5) --  
3.3.1.11.6 Example (6) -- 3.3.1.11.7 Example (7) -- 3.3.1.12 Crop  
performance indices -- 3.4 Non-statistical procedure for estimating  
the parameters (physical approach) -- 3.4.1 Non-statistical procedure  
of parameter estimation -- 3.4.1.1 Cuestimate of the intrinsic rate of  
increase -- 3.4.1.2 Computer language programming and simulation  
studies on large computer as a non-statistical approach for estimating  
parameters and for sensitivity analysis -- 3.4.1.3 Non-statistical  
approach for parameter estimate in stochastic models -- 3.4.1.4

Estimation of binomial coefficient with non-statistical method --  
3.4.1.4.1 Example from Lewis (1971).  
3.4.1.4.2 Binomial distribution (theorem) -- 3.4.1.5 Multinomial  
distribution -- 3.4.1.5.1 Example -- 3.4.1.6 Poisson distribution --  
3.4.1.7 Optimum seeking designs as a non-statistical approach in  
design of simulation experiments -- 3.4.1.8 Fitting model equations to  
experimental data -- 3.4.1.8.1 Selecting equations for fitting --  
3.4.1.8.2 Standard equation types -- 3.4.1.9 Mathematical formulation  
for solving the differential equation (analytical solution) -- 3.4.1.10  
Mathematical formulation for solving the difference equation  
(numerical solution) -- 3.4.1.10.1 The finite difference approach --  
3.4.1.10.2 The Euler technique -- 3.4.1.10.3 An iterated second order  
Runge-Kutta method -- References -- 4. COMPUTER IMPLEMENTATION  
-- 4.1 Model software requirement -- 4.1.1 General purpose languages  
-- 4.1.2 Special-purpose simulation languages -- 4.1.3 Requirement  
of general-purpose or special purpose language -- 4.1.4 Requirement  
of special-purpose language -- 4.1.5 Recent softwares developed --  
4.2 Generalized model -- 4.2.1 Specialization and generalization --  
4.2.2 Constraints and characteristics of specialization and generaliza  
tion -- 4.3 Software specification -- 4.3.1 Command language --  
4.3.1.1 Data manipulating language for the hierarchial model --  
4.3.1.1.1 The GET command -- 4.3.1.1.2 THE GET PATH and GET NEXT  
WITHIN PARENT retrieval commands -- 4.3.1.1.3 HDML commands for  
update -- 4.3.1.1.4 IMS: A hierarchial DBMS -- 4.3.2 Program --  
4.3.2.1 Flowcharting -- 4.3.2.1.1 General flowcharting rules --  
4.3.2.1.2 Flowchart symbols and their use -- 4.3.2.1.3 Examples of  
simple flowcharts -- 4.3.2.2 Introduction of basic programming --  
4.3.2.2.1 BASIC program -- 4.3.2.2.2 Line number -- 4.3.2.2.3 REM --  
4.3.2.2.4 READ and DATA -- 4.3.2.2.5 PRINT -- 4.3.2.2.6 LET --  
4.3.2.2.7 Variables -- 4.3.2.2.8 Constants -- 4.3.2.2.9 GOTO --  
4.3.2.2.10 STOP.  
4.3.2.2.11 IF. THEN -- 4.3.2.2.12 FOR and NEXT -- 4.3.2.2.13 Numeric  
functions -- 4.3.2.2.14 PRINT TAB -- 4.3.2.2.15 PRINT USING (TRS-80  
only) -- 4.3.2.2.16 GOSUB and RETURN -- 4.3.2.2.17 GRAPH  
SUBROUTINE -- 4.3.2.2.18 Arrays and subscripted variables --  
4.3.2.2.19 Matrix subroutine -- 4.3.2.2.19.1 Inputting data to a matrix  
-- 4.3.2.2.19.2 Printing a matrix -- 4.3.2.2.19.3 Scalar multiplication  
by a constant, K -- 4.3.2.2.19.4 Post-multiplication of a matrix by a  
vector,  $X \otimes$  -- 4.3.2.2.20 Important command mode instructions for  
apple ii and TRS-80 -- 4.3.2.2.20.1 Apple 0 plus -- 4.3.3 Data  
structure -- 4.3.3.1 Object data structure -- 4.3.3.2 The relational data  
structure -- 4.3.3.2.1 Relational model concepts -- 4.3.3.2.1.1  
Domains, attributes, tuples, and relations -- 4.3.3.3 Network data  
structure -- 4.3.3.3.1 Network data modeling concepts -- 4.3.3.3.1.1  
Records, record types, and data items -- 4.3.3.3.1.2 Set types and their  
basic properties -- 4.3.3.3.2 Special type of sets -- 4.3.3.3.3 Stored  
representations of set instances -- 4.3.3.3.4 Using sets to represent M  
: N relationships -- 4.3.3.4 Hierarchial data structure -- 4.3.3.4.1  
Hierarchial database structures -- 4.3.3.4.1.1 Parent-child  
relationships and hierarchial schemas -- 4.3.3.4.1.2 Properties of a  
hierarchial schema -- 4.3.3.4.1.3 Hierarchial occurrence trees --  
4.3.3.4.1.4 Linearized form of a hierarchial occurrence tree --  
4.3.3.4.1.5 Virtual parent-child relationships -- 4.4 Data systems --  
4.4.1 Centralized data system -- 4.4.1.1 Centralized DBMS (Database  
Management System) Architect -- 4.4.1.2 Client-server architecture --  
4.4.1.3 Client-server architectures for DBMSs -- 4.4.2 Hierarchial data  
system -- 4.4.2.1 Integrity constraints in the hierarchial model --  
4.4.2.2 Data definition in the hierarchial model -- 4.4.2.3 Data

manipulation language for the hierarchial model.

4.4.2.3.1 The get command.

---