

Lecture Notes in Economics and Mathematical Systems

Managing Editors: M. Beckmann and W. Krelle
Economic Theory

212

Ryuzo Sato
Takayuki Nôno

FB Mathematik
TU Darmstadt



58365173

Invariance Principles
and the Structure
of Technology



Fachbereich Mathematik
Technische Hochschule Darmstadt

Bibliothek

Inv.-Nr. B 19.612

Springer-Verlag
Berlin Heidelberg New York Tokyo 1983

TABLE OF CONTENTS

Chapter 1.	<u>Introduction</u>	1
Chapter 2.	<u>Lie Group Methods and the Theory of Estimating Total Productivity</u>	6
I.	<u>Holotheticity and the Scale Effect</u>	6
A.	<u>Lie Group Theory</u>	6
B.	<u>Estimation Procedures</u>	13
C.	<u>Estimation of the Scale Effect</u>	17
II.	<u>The Lie Operator Technique for Estimating Productivity</u>	19
III.	<u>The Effect of Technical Progress Represented by New Forms of the Production Function</u>	24
Chapter 3.	<u>Invariance Principle and "G-Neutral" Types of Technical Change</u>	29
I.	<u>Introduction</u>	29
II.	<u>"Neutral Types" of Technical Progress</u>	30
III.	<u>"G-Neutral" Types of Technical Change</u>	34
IV.	<u>G-Neutral Technical Change Generated by the One-Parameter Lie Subgroups of $GP(2, R)$</u>	42
V.	<u>G_3-Types of Neutral Technical Change</u>	46
VI.	<u>Invariance of the Regularity Conditions Under Technical Change</u>	48
Chapter 4.	<u>Analysis of Production Functions by "G-Neutral" Types of Technical Change</u>	53
I.	<u>Introduction and Summary</u>	53
II.	<u>G-Neutral Technical Change</u>	53
III.	<u>Symmetry Groups of Neutral Technical Changes</u>	57
IV.	<u>G_3-Family of Neutrality</u>	63
V.	<u>Sato-Beckmann Types of Neutral Technical Changes</u>	68
Chapter 5.	<u>Neutrality of Inventions and the Structure of Production Functions</u>	72
I.	<u>Introduction and Summary</u>	72
II.	<u>G-Neutral Technical Change</u>	72
III.	<u>Symmetry Groups of Neutral Technical Changes</u>	75
IV.	<u>Hicks-Harrod-Solow Family of Neutral Technical Change</u>	87
References		90