

1. Record Nr.	UNINA9911019259203321
Autore	Gittins John C. <1938->
Titolo	Multi-armed bandit allocation indices // John Gittins, Kevin Glazebrook, Richard Weber
Pubbl/distr/stampa	Chichester, : Wiley, 2011
ISBN	1-283-37409-9 9786613374097 0-470-98004-4 0-470-98003-6
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (311 p.)
Altri autori (Persone)	GlazebrookKevin D. <1950-> WeberRichard <1953->
Disciplina	519.5
Soggetti	Resource allocation - Mathematical models Mathematical optimization Programming (Mathematics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Multi-armed Bandit Allocation Indices; Contents; Foreword; Foreword to the first edition; Preface; Preface to the first edition; 1 Introduction or exploration; Exercises; 2 Main ideas: Gittins index; 2.1 Introduction; 2.2 Decision processes; 2.3 Simple families of alternative bandit processes; 2.4 Dynamic programming; 2.5 Gittins index theorem; 2.6 Gittins index; 2.6.1 Gittins index and the multi-armed bandit; 2.6.2 Coins problem; 2.6.3 Characterization of the optimal stopping time; 2.6.4 The restart-in-state formulation; 2.6.5 Dependence on discount factor 2.6.6 Myopic and forwards induction policies2.7 Proof of the index theorem by interchanging bandit portions; 2.8 Continuous-time bandit processes; 2.9 Proof of the index theorem by induction and interchange argument; 2.10 Calculation of Gittins indices; 2.11 Monotonicity conditions; 2.11.1 Monotone indices; 2.11.2 Monotone jobs; 2.12 History of the index theorem; 2.13 Some decision process theory; Exercises; 3 Necessary assumptions for indices; 3.1 Introduction; 3.2 Jobs; 3.3 Continuous-time jobs; 3.3.1 Definition; 3.3.2 Policies for

continuous-time jobs

3.3.3 The continuous-time index theorem for a SFABP of jobs3.4

Necessary assumptions; 3.4.1 Necessity of an infinite time horizon;

3.4.2 Necessity of constant exponential discounting; 3.4.3 Necessity of a single processor; 3.5 Beyond the necessary assumptions; 3.5.1

Bandit-dependent discount factors; 3.5.2 Stochastic discounting; 3.5.3

Undiscounted rewards; 3.5.4 A discrete search problem; 3.5.5 Multiple processors; Exercises; 4 Superprocesses, precedence constraints and

arrivals; 4.1 Introduction; 4.2 Bandit superprocesses; 4.3 The index

theorem for superprocesses

4.4 Stoppable bandit processes4.5 Proof of the index theorem by

freezing and promotion rules; 4.5.1 Freezing rules; 4.5.2 Promotion

rules; 4.6 The index theorem for jobs with precedence constraints; 4.7

Precedence constraints forming an out-forest; 4.8 Bandit processes

with arrivals; 4.9 Tax problems; 4.9.1 Ongoing bandits and tax

problems; 4.9.2 Klimov's model; 4.9.3 Minimum EWFT for the M/G/1

queue; 4.10 Near optimality of nearly index policies; Exercises; 5 The

achievable region methodology; 5.1 Introduction; 5.2 A simple

example; 5.3 Proof of the index theorem by greedy algorithm

5.4 Generalized conservation laws and indexable systems5.5

Performance bounds for policies for branching bandits; 5.6 Job

selection and scheduling problems; 5.7 Multi-armed bandits on parallel

machines; Exercises; 6 Restless bandits and Lagrangian relaxation; 6.1

Introduction; 6.2 Restless bandits; 6.3 Whittle indices for restless

bandits; 6.4 Asymptotic optimality; 6.5 Monotone policies and simple

proofs of indexability; 6.6 Applications to multi-class queueing

systems; 6.7 Performance bounds for the Whittle index policy; 6.8

Indices for more general resource configurations; Exercises

7 Multi-population random sampling (theory)

Sommario/riassunto

In 1989 the first edition of this book set out Gittins' pioneering index solution to the multi-armed bandit problem and his subsequent investigation of a wide of sequential resource allocation and stochastic scheduling problems. Since then there has been a remarkable flowering of new insights, generalizations and applications, to which Glazebrook and Weber have made major contributions. This second edition brings the story up to date. There are new chapters on the achievable region approach to stochastic optimization problems, the construction of performance bounds for suboptimal policies, W
