1.	Record Nr.	UNINA9910812197403321
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	Titolo	Algebras, graphs and their applications / / Ilwoo Cho ; edited by Palle E.T. Jorgensen
	Pubbl/distr/stampa	Boca Raton : , : CRC Press, , [2014]
	ISBN	0-429-07388-7
		1-4665-9019-X
	Descrizione fisica	1 online resource (442 p.)
	Classificazione	MAT002000MAT037000
	Disciplina	511.54
		511/.54
	Soggetti	Groupoids
		Operator theory
	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	Front Cover; Dedication; Preface; Contents; Chapter 1: Algebra on Graphs; Chapter 2: Representations and Operator Algebras of Graph Groupoids; Chapter 3: Operator Theory on Graphs; Chapter 4: Fractals on Graph Groupoids; Chapter 5: Entropy Theory on Graphs; Chapter 6: Jones Index Theory on Graph Groupoids; Chapter 7: Network Theory on Graphs; Chapter 8: K-Theory on Graphs
	Sommario/riassunto	Preface In this book, we consider algebra on directed graphs. From combinatorial objects, direct graphs, we establish corresponding algebraic objects which become groupoids. We call such groupoids graph groupoids. Connected with groupoid theory, we investigate the properties of graph groupoids. From this investigation, we can realize that graph groupoids act like the free groups in group theory. In other words, the study of graph groupoids is understood as groupoidal version of free-group theory. As application, we observe how graph groupoids are playing their role in different mathematical and scientific areas, including general groupoid theory, representation theory, automata theory, operator algebra (von Neumann algebra theory, C*-algebra theory, free probability, and index theory), noncommutative dynamical systems (groupoid dynamical systems), operator theory (spectral theory), fractal theory, information theory (entropy theory),

and network theory, etc. We can check all operated groupoids (for instance, groupoid sums, product groupoids, quotient groupoids, etc) of graph groupoids are graph groupoids, too. This means that the study of operated groupoids of graph groupoids becomes nothing but studying other graph groupoids. It makes us easy to handle graph-groupoid related structures--