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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--
