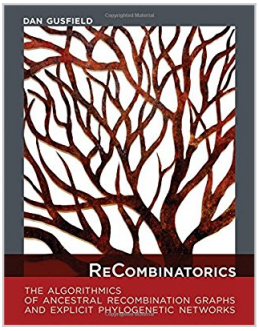

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press)

By Dan Gusfield

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield

In this book, Dan Gusfield examines combinatorial algorithms to construct genealogical and exact phylogenetic networks, particularly ancestral recombination graphs (ARGs). The algorithms produce networks (or information about networks) that serve as hypotheses about the true genealogical history of observed biological sequences and can be applied to practical biological problems.

Phylogenetic trees have been the traditional means to represent evolutionary history, but there is a growing realization that networks rather than trees are often needed, most notably for recent human history. This has led to the development of ARGs in population genetics and, more broadly, to phylogenetic networks. ReCombinatorics offers an in-depth, rigorous examination of current research on the combinatorial, graph-theoretic structure of ARGs and explicit phylogenetic networks, and algorithms to reconstruct or deduce information about those networks.

ReCombinatorics, a groundbreaking contribution to the emerging field of phylogenetic networks, connects and unifies topics in population genetics and phylogenetics that have traditionally been discussed separately and considered to be unrelated. It covers the necessary combinatorial and algorithmic background material; the various biological phenomena; the mathematical, population genetic, and phylogenetic models that capture the essential elements of these phenomena; the combinatorial and algorithmic problems that derive from these models; the theoretical results that have been obtained; related software that has been developed; and some empirical testing of the software on simulated and real biological data.

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press)

By Dan Gusfield

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield

In this book, Dan Gusfield examines combinatorial algorithms to construct genealogical and exact phylogenetic networks, particularly ancestral recombination graphs (ARGs). The algorithms produce networks (or information about networks) that serve as hypotheses about the true genealogical history of observed biological sequences and can be applied to practical biological problems.

Phylogenetic trees have been the traditional means to represent evolutionary history, but there is a growing realization that networks rather than trees are often needed, most notably for recent human history. This has led to the development of ARGs in population genetics and, more broadly, to phylogenetic networks. ReCombinatorics offers an in-depth, rigorous examination of current research on the combinatorial, graph-theoretic structure of ARGs and explicit phylogenetic networks, and algorithms to reconstruct or deduce information about those networks.

ReCombinatorics, a groundbreaking contribution to the emerging field of phylogenetic networks, connects and unifies topics in population genetics and phylogenetics that have traditionally been discussed separately and considered to be unrelated. It covers the necessary combinatorial and algorithmic background material; the various biological phenomena; the mathematical, population genetic, and phylogenetic models that capture the essential elements of these phenomena; the combinatorial and algorithmic problems that derive from these models; the theoretical results that have been obtained; related software that has been developed; and some empirical testing of the software on simulated and real biological data.

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield Bibliography

- Sales Rank: #1909349 in Books
- Published on: 2014-07-03
- Original language: English
- Number of items: 1
- Dimensions: 9.00" h x 1.00" w x 7.00" l, .0 pounds
- Binding: Hardcover
- 600 pages

Editorial Review

Review

Understanding how genomes have evolved requires combining 'vertical' evolution (mutation and selection) with 'horizontal' events (notably recombination). The resulting intricate pattern of ancestry is called an 'ancestral recombination graph' (ARG). Dan Gusfield has been a leading figure in their study for many years. His latest book *ReCombinatorics* provides a fascinating and engaging account of the combinatorial and algorithmic properties of ARGs and related phylogenetic networks. Its wealth of recent results--for both newcomers and experts alike--offers a much-needed treatment to better link phylogenetics and population genetics.

(Mike Steel, Professor of Mathematics and Statistics, University of Canterbury; Fellow of the Royal Society of New Zealand (FRSNZ); and coauthor of *Phylogenetics*)

ReCombinatorics does a brilliant job laying out rigorous solutions to the haplotype phasing problem under the constraint that there is only limited recombination. This proves to be a surprisingly central problem in human population genetics, and the sections dealing with testing genetic association using methods based on the haplotype tree and on ancestral recombination graphs have a mathematical precision combined with excellent figures and pseudocode to guide the reader.

(Andrew G. Clark, Jacob Gould Schurman Professor of Population Genetics, Cornell University)

This is an absolutely beautifully written book, and should be essential reading for anyone wishing to understand phylogenetic networks, whether from a population genetics or a phylogenetics viewpoint. What is most impressive is the wonderful discussion of the history of ideas and techniques in these fields, so that even a non-mathematician can learn a great deal. For mathematically inclined researchers, this may be one of the most important and useful books in computational biology they'll ever read.

(Tandy Warnow, Founder Professor of Bioengineering and Computer Science, University of Illinois at Urbana-Champaign)

The book is highly organized, easy to follow, and easy to read. It is self-contained both with respect to biology and combinatorics, and it would be suitable for a researcher in either discipline, or in computer science, who wants to learn the necessary background and theorems.

(*Computing Reviews*)

About the Author

Dan Gusfield is Professor of Computer Science at the University of California, Davis. He is the coauthor of *The Stable Marriage Problem: Structure and Algorithms* (MIT Press) and author of *Algorithms on Strings, Trees, and Sequences*.

Users Review

From reader reviews:

Mark Frey:

The e-book with title ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) contains a lot of information that you can find out it. You can get a lot of help after read this book. This particular book exist new know-how the information that exist in this e-book represented the condition of the world today. That is important to yo7u to learn how the improvement of the world. This particular book will bring you inside new era of the the positive effect. You can read the e-book with your smart phone, so you can read it anywhere you want.

Velda Thornley:

The particular book ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) has a lot associated with on it. So when you read this book you can get a lot of profit. The book was written by the very famous author. Mcdougal makes some research just before write this book. This specific book very easy to read you can find the point easily after reading this book.

Cleveland Wheeler:

The reason why? Because this ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) is an unordinary book that the inside of the publication waiting for you to snap the item but latter it will shock you with the secret this inside. Reading this book next to it was fantastic author who else write the book in such amazing way makes the content inside of easier to understand, entertaining means but still convey the meaning completely. So , it is good for you for not hesitating having this any longer or you going to regret it. This excellent book will give you a lot of gains than the other book have got such as help improving your skill and your critical thinking approach. So , still want to postpone having that book? If I had been you I will go to the e-book store hurriedly.

Douglas Brownlee:

A lot of publication has printed but it differs from the others. You can get it by net on social media. You can choose the most effective book for you, science, amusing, novel, or whatever simply by searching from it. It is identified as of book ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press). You can include your knowledge by it. Without leaving behind the printed book, it might add your knowledge and make anyone happier to read. It is most important that, you must aware about publication. It can bring you from one destination to other place.

Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield #QWT81M726BK

Read ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield for online ebook

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield books to read online.

Online ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield ebook PDF download

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield Doc

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield Mobipocket

ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield EPub

QWT81M726BK: ReCombinatorics: The Algorithmics of Ancestral Recombination Graphs and Explicit Phylogenetic Networks (MIT Press) By Dan Gusfield