Prof. Karl Dilcher (Dalhousie University)

Book *Reviews bring interesting mathematical sciences and education publications drawn from across the entire spectrum of mathematics to the attention of the CMS readership. Comments, suggestions, and submissions are welcome.*

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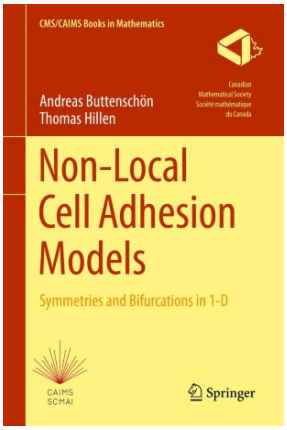
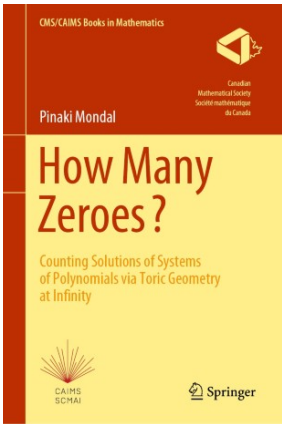
The two titles featured in this column are the first volumes in the new CMS/CAIMS book series, which succeeds the previous "CMS Books in Mathematics". Full reviews of both volumes will be published in due course; therefore, just the publisher's descriptions are given here.



Non-Local Cell Adhesion Models
Symmetries and Bifurcations in 1-D

by Andreas Buttenschön and Thomas Hillen
CMS/CAIMS Books in Mathematics, Springer, 2021
ISBN: 978-3-030-67110-5

Publisher's description: "This monograph considers the mathematical modeling of cellular adhesion, a key interaction force in cell biology. While deeply grounded in the biological application of cell adhesion and tissue formation, this monograph focuses on the mathematical analysis of non-local adhesion models. The novel aspect is the non-local term (an integral operator), which accounts for forces generated by long ranged cell interactions. The analysis of non-local models has started only recently, and it has become a vibrant area of applied mathematics. This monograph contributes a systematic analysis of steady states and their bifurcation structure, combining global bifurcation results pioneered by Rabinowitz, equivariant bifurcation theory, and the symmetries of the non-local term. These methods allow readers to analyze and understand cell adhesion on a deep level."



How Many Zeroes?
Counting Solutions of Systems of Polynomials via Toric Geometry at Infinity

by Pinaki Mondal
CMS/CAIMS Books in Mathematics, Springer, 2021
ISBN: 978-3-030-75173-9

Publisher's description: "This graduate textbook presents an approach through toric geometry to the problem of estimating the isolated solutions (counted with appropriate multiplicity) of n polynomial equations in n variables over an algebraically closed field K. The text collects and synthesizes a number of works on Bernstein's theorem of counting solutions of generic systems, ultimately presenting the theorem, commentary, and extensions in a comprehensive and coherent manner. It begins with Bernstein's original theorem expressing solutions of generic systems in terms of the mixed volume of their Newton polytopes, including complete proofs of its recent extension to affine space and some applications to open problems. The text also applies the developed techniques to derive and generalize Kushnirenko's results on Milnor numbers of hypersurface singularities, which has served as a precursor to the development of toric geometry. Ultimately, the book aims to present material in an elementary format, developing all necessary algebraic geometry to provide a truly accessible overview suitable to a second-year graduate students."