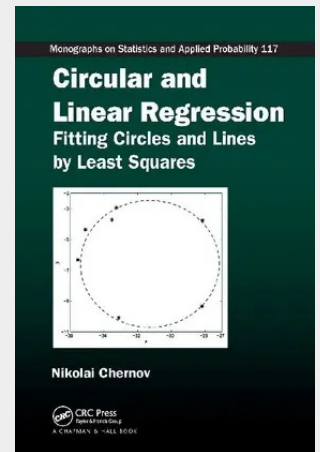


Circular and Linear Regression

Fitting Circles and Lines by Least Squares

Find the right algorithm for your image processing application Exploring the recent achievements that have occurred since the mid-1990s, Circular and Linear Regression: Fitting Circles and Lines by Least Squares explains how to use modern algorithms to fit geometric contours (circles and circular arcs) to observed data in image processing and computer vision. The author covers all facets—geometric, statistical, and computational—of the methods. He looks at how the numerical algorithms relate to one another through underlying ideas, compares the strengths and weaknesses of each algorithm, and illustrates how to combine the algorithms to achieve the best performance. After introducing errors-in-variables (EIV) regression analysis and its history, the book summarizes the solution of the linear EIV problem and highlights its main geometric and statistical properties. It next describes the theory of fitting circles by least squares, before focusing on practical geometric and algebraic circle fitting methods. The text then covers the statistical analysis of curve and circle fitting methods. The last chapter presents a sample of "exotic" circle fits, including some mathematically sophisticated procedures that use complex numbers and conformal mappings of the complex plane. Essential for understanding the advantages and limitations of the practical schemes, this book thoroughly addresses the theoretical aspects of the fitting problem. It also identifies obscure issues that may be relevant in future research.

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73,70 €

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Lieferfrist: bis zu 10 Tage

Artikelnummer: 9780367577179

Medium: Buch

ISBN: 978-0-367-57717-9

Verlag: CRC Press

Erscheinungstermin: 30.06.2020

Sprache(n): Englisch

Auflage: 1. Auflage 2020

Serie: Chapman & Hall/CRC
Monographs on Statistics and Applied
Probability

Produktform: Kartoniert

Gewicht: 442 g

Seiten: 286

Format (B x H): 156 x 234 mm

