

[Home](#) > [Swarm Intelligence](#) > Conference paper

Particle Swarm Optimization of Bollinger Bands

| Conference paper

| pp 504–511 | [Cite this conference paper](#)



[Swarm Intelligence](#)

(ANTS 2010)

[Matthew Butler & Dimitar Kazakov](#)

Part of the book series: [Lecture Notes in Computer Science](#) ((LNTCS, volume 6234))

Included in the following conference series:

[International Conference on Swarm Intelligence](#)

3147 Accesses 13 Citations 3 Altmetric

Abstract

The use of technical indicators to derive stock trading signals is a foundation of financial technical analysis. Many of these indicators have several parameters which creates a difficult optimization problem given the highly non-linear and non-stationary nature of a financial time-series. This study investigates a popular financial indicator, Bollinger Bands, and the fine tuning of its parameters via particle swarm optimization under 4 different fitness functions: profitability,

Sharpe ratio, Sortino ratio and accuracy. The experiment results show that the parameters optimized through PSO using the profitability fitness function produced superior out-of-sample trading results which includes transaction costs when compared to the default parameters.

 This is a preview of subscription content, [log in via an institution](#)  to check access.

Access this chapter

[Log in via an institution](#) 

Subscribe and save

 Springer+ from €37.37 /Month

- Starting from 10 chapters or articles per month
- Access and download chapters and articles from more than 300k books and 2,500 journals
- Cancel anytime

[View plans](#) 

Buy Now

Chapter

EUR 29.95

Price includes VAT (Poland)

- Available as PDF
- Read on any device
- Instant download
- Own it forever

[Buy Chapter](#) 

eBook

EUR 85.59

Price includes VAT (Poland)

- Available as PDF
- Read on any device
- Instant download
- Own it forever

[Buy eBook](#) 

Softcover Book

EUR 106.99

Price includes VAT (Poland)

- Compact, lightweight edition
- Dispatched in 3 to 5 business days
- Free shipping worldwide - [see info](#)

[Buy Softcover Book →](#)

Tax calculation will be finalised at checkout

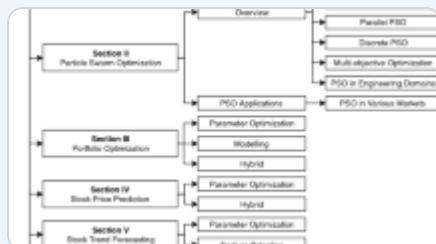
Purchases are for personal use only

[Institutional subscriptions →](#)

Preview

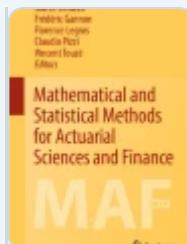
Unable to display preview. [Download preview PDF.](#)

Similar content being viewed by others



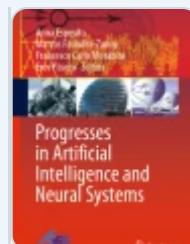
[A Comprehensive Survey on Portfolio Optimization, Stock Price and Trend Prediction Using Particle Swarm...](#)

Article | 19 June 2020



[PSO for the Sharpe Ratio in a Financial Trading System Based on Technical Analysis](#)

Chapter | © 2024



[Exploration and Exploitation in Optimizing a Basic Financial Trading System: A Comparison Between FA...](#)

Chapter | © 2021

Explore related subjects

Discover the latest articles, books and news in related subjects, suggested using machine learning.

[Financial Econometrics](#)

[Lead Optimization](#)

[Mathematical Finance](#)

[Optimization](#)

[Quantitative Finance](#)

[Statistical Finance](#)

References

1. Lee, J.S., Lee, S., Chang, S., Ahn, B.H.: A comparison of ga and pso for excess return evaluation in stock markets. In: Mira, J., Álvarez, J.R. (eds.) IWINAC 2005, Part II. LNCS, vol. 3562, pp. 221–230. Springer, Heidelberg (2005)

[Google Scholar](#)

2. Lento, C., Gradojevic, N.: The profitability of technical trading rules: a combined signal approach. *Journal of Applied Business Research* 23(1), 13–27 (2007)

[Google Scholar](#)

3. Lento, C., Gradojevic, N., Wright, C.: Investment information content in Bollinger Bands? *Applied Financial Economics Letters* 3(4), 263–267 (2007)

[Article](#) [Google Scholar](#)

4. Leung, J., Chong, T.: An empirical comparison of moving average envelopes and Bollinger Bands. *Applied Economics Letters* 10(6), 339–341 (2003)

[Article](#) [Google Scholar](#)

5. Moody, J., Wu, L., Liao, Y., Saffell, M.: Performance functions and reinforcement learning for trading systems and portfolios. *Applied Financial Economics Letters* 17, 441–470 (1998)

[Google Scholar](#)

6. Shi, Y., Eberhart, R.: A modified particle swarm optimizer. In: Proceedings of the 1998 IEEE International Conference on Evolutionary Computation, IEEE World Congress on Computational Intelligence, pp. 69–73 (1998)

7. Williams, O.: Empirical Optimization of Bollinger Bands for Profitability.
Master's thesis, Simon Fraser University (2006)

[Google Scholar](#)

Author information

Authors and Affiliations

Faculty of Computer Science, Artificial Intelligence Group, University of York, UK

Matthew Butler & Dimitar Kazakov

Editor information

Editors and Affiliations

IRIDIA, CoDE, Université Libre de Bruxelles, Brussels, Belgium

Marco Dorigo

IRIDIA, CoDE, Université Libre de Bruxelles, Av. F. Roosevelt 50, CP 194/6, 1050, Brussels, Belgium

Mauro Birattari

'Dalla Molle' Institute for Artificial Intelligence (IDSIA), Galleria 2, 6928, Manno-Lugano, Switzerland

Gianni A. Di Caro

Complex Systems Institute, Paris-Ile-de-France, CREA, Ecole Polytechnique & CNRS, 57-59, rue Lhomond, 75005, Paris, France

René Doursat

Department of Computer Science, University of Pretoria, 0002, P.O. Box, Pretoria, South Africa

Andries P. Engelbrecht

Dario Floreano

Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA), Lugano, Switzerland

Luca Maria Gambardella

Department of Automatic Control and Systems Engineering, The University of Sheffield, Mappin Street, S1 3JD, Sheffield, UK

Roderich Groß

KOVAN Research Lab., Department of Computer Engineering, Middle East Technical University, Inonu Bulvari, 06531, Ankara, Turkey

Erol Şahin

Department of Bioengineering, Binghamton University, State University of New York, 13902-6000, Binghamton NY, USA

Hiroki Sayama

IRIDIA, CoDE, Université Libre de Bruxelles, Avenue F. Roosevelt 50, CP 194/6, 1050, Brussels, Belgium

Thomas Stützle

Rights and permissions

[Reprints and permissions](#)

Copyright information

© 2010 Springer-Verlag Berlin Heidelberg

About this paper

Cite this paper

Butler, M., Kazakov, D. (2010). Particle Swarm Optimization of Bollinger Bands. In: Dorigo, M., et al. Swarm Intelligence. ANTS 2010. Lecture Notes in Computer Science, vol 6234. Springer, Berlin, Heidelberg.

[.RIS↓](#) [.ENW↓](#) [.BIB↓](#)

DOI	Publisher Name	Print ISBN
https://doi.org/10.1007/978-3-642-15461-4_50	Springer, Berlin, Heidelberg	978-3-642-15460-7

Online ISBN	eBook Packages
978-3-642-15461-4	Computer Science Computer Science (R0) Springer Nature Proceedings Computer Science

Keywords

[particle swarm optimization](#) [Bollinger Bands](#) [Sharpe ratio](#)
[Sortino ratio and parameter optimization](#)

Publish with us

[Policies and ethics](#) 

Search

Search by keyword or author



Navigation

Find a journal

Publish with us

Track your research

