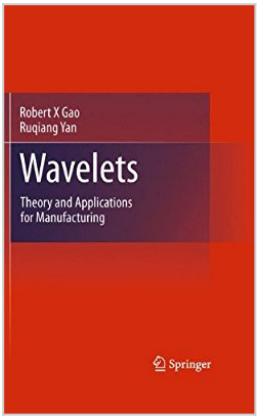

Wavelets: Theory and Applications for Manufacturing

By Robert X Gao, Ruqiang Yan

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Wavelets: Theory and Applications for Manufacturing presents a systematic description of the fundamentals of wavelet transform and its applications. Given the widespread utilization of rotating machines in modern manufacturing and the increasing need for condition-based, as opposed to fix-interval, intelligent maintenance to minimize machine down time and ensure reliable production, it is of critical importance to advance the science base of signal processing in manufacturing. This volume also deals with condition monitoring and health diagnosis of rotating machine components and systems, such as bearings, spindles, and gearboxes, while also: -Providing a comprehensive survey on wavelets specifically related to problems encountered in manufacturing - Discussing the integration of wavelet transforms with other soft computing techniques such as fuzzy logic, for machine defect and severity classification - Showing how to custom design wavelets for improved performance in signal analysis Focusing on wavelet transform as a tool specifically applied and designed for applications in manufacturing, Wavelets: Theory and Applications for Manufacturing presents material appropriate for both academic researchers and practicing engineers working in the field of manufacturing.

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Wavelets: Theory and Applications for Manufacturing By Robert X Gao, Ruqiang Yan Bibliography

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Editorial Review

Review

From the reviews:

“The book presents the theory and practice of wavelets and shows applicability of the wavelet transform to solve the problems typically encountered in various fields of engineering. … The book can be recommended for both researches and practitioners working in the field of manufacturing.” (Zygmunt Hasiewicz, Zentralblatt MATH, Vol. 1227, 2012)

From the Back Cover
Wavelets: Theory and Applications for Manufacturing presents a systematic yet easily accessible description of the fundamentals of wavelet transform and its applications in manufacturing. Given the widespread utilization of machine tools in modern manufacturing and the increasing need for minimizing unexpected machine down-time to ensure reliable, economical, and high quality production, it is of critical importance to continually advance the science base for machine condition monitoring, fault diagnosis, and remaining service life prognosis. The adaptive, multi-resolution capability of the wavelet transform has made it a powerful mathematical tool for accomplishing such goals. In addition, this volume also: •Provides a historical overview of the evolution of signal processing techniques, from the Fourier transform to wavelet transform •Introduces the fundamental mathematics for understanding what wavelet transform is and does, and how to apply it to problems typically encountered in manufacturing •Discusses the integration of wavelet transforms with other techniques, such as signal enveloping and neural networks, for enhanced machine defect detection and severity classification •Demonstrates how to select an appropriate base wavelet or custom design a wavelet for optimal performance in signal analysis Focusing on wavelet transform as a tool specifically applied to and designed for manufacturing, Wavelets: Theory and Applications for Manufacturing presents material appropriate for both academic researchers and practicing engineers working in the field of manufacturing.

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Robert Burmeister:

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