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In a field as rapidly expanding as digital signal processing, even the topics relevant to the basics change over time both in their nature and their relative importance. It is important, therefore, to have an up-to-date text that

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not only covers the fundamentals, but that also follows a logical development that leaves no gaps readers must

somehow bridge by themselves. Digital Signal Processing with Examples in MATLAB® is just such a text. The

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presentation does not focus on DSP in isolation, but relates it to continuous signal processing and treats digital signals as samples of physical phenomena. The author also takes care to introduce important topics not usually

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addressed in signal processing texts, including the discrete cosine and wavelet transforms, multirate signal processing, signal coding and compression, least squares systems design, and adaptive signal processing.

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He also uses the industry-standard software MATLAB to provide examples of signal processing, system design, spectral analysis, filtering, coding and compression, and exercise solutions. All of the examples and functions used

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contained, and rigorous. For basic DSP, it is quite simply the only book you need.

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volume takes a

structured approach,  
starting with basic  
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the most sophisticated systems. It summarizes material from research papers, lectures, and presentations.

Organized into four parts, the text first provides the background of video coding theory,

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principles of video transmission, and video coding standards. The

second part includes three chapters that explain the theory of video transcoding and practical

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scheduling, and encryption in the transcoding. The book concludes by describing the application of transcoding, universal multimedia access with the emerging MPEG-21 standard, and the end-to-end test bed.

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Rate-Quality

Optimized Video

Coding discusses the

matter of optimizing

(or negotiating) the

data rate of

compressed digital

video and its quality,

which has been a

relatively neglected

topic in either side of

image/video coding

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and tele-traffic management. Video rate management becomes a technically challenging task since it is required to maintain a certain video quality regardless of the availability of transmission or

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storage media. This is caused by the broadband nature of digital video and inherent algorithmic features of mainstream video compression schemes, e.g. H.261, H.263 and MPEG series. In order to maximize the media

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utilization and to enhance video quality, the data rate of compressed video should be regulated within a budget of available media resources while maintaining the video quality as high as possible. In Part I (Chapters 1 to 4) the

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non-stationarity of digital video is discussed. Since the non-stationary nature is also inherited from algorithmic properties of international video coding standards, which are a combination of

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statistical coding techniques, the video rate management techniques of these standards are explored. Although there is a series of known video rate control techniques, such as picture rate variation, frame dropping, etc., these

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techniques do not view the matter as an optimization between rate and quality. From the view of rate-quality optimization, the quantizer is the sole means of controlling rate and quality. Thus, quantizers and quantizer control



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techniques are analyzed, based on the relationship of rate and quality. In Part II (Chapters 5 and 6), as a coherent approach to non-stationary video, established but still thriving nonlinear techniques are applied to video rate-

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quality optimization such as artificial neural networks including radical basis function networks, and fuzzy logic-based schemes. Conventional linear techniques are also described before the nonlinear techniques are explored. By

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using these nonlinear techniques, it is shown how they influence and tackle the rate-quality optimization problem. Finally, in Chapter 7 rate-quality optimization issues are reviewed in emerging video

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communication applications such as video transcoding and mobile video.

This chapter discusses some new issues and prospects of rate and quality control in those technology areas.

Rate-Quality  
Optimized Video

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*audio coding  
technology. In  
the book, the  
theory and  
implementation  
of each of the  
basic coder  
building blocks  
is addressed.  
The building  
blocks are then  
fit together  
into a full*

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the performance  
of such a  
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*The*  
*requirements*  
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*communications*  
*increase*  
*rapidly in the*  
*last two*  
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such as  
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In order to  
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series of video  
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*coding standards have been developed such as MPEG-2, MPEG-4, MPEG-21 for audio and video by ISO/IEC, H.26x for video and G.72x for audio by ITU-T, Video Coder 1 (VC-1) for video by*

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AVS China is  
the  
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AVS1-P2 (Video  
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AVS1-P3 (Audio  
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*Video), AVS-S-P2 (Video) and  
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