WAVELETS AND MULTIRATE DIGITAL SIGNAL PROCESSING

Lecture 20: The Time Frequency Plane and Its Tilings

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Self Evaluation Quizzes

Q 1. Why is Gaussian function not realizable and why cannot we approximate it by truncating?
Ans. Gaussian function is defined for all time ($-\infty$ to ∞) and it tends to zero as t approaches ∞ or -∞. Unfortunately there is no physical system which can generate such a waveform so it is not realizable.
The choice of Gaussian function is because of its optimality in terms of time bandwidth product. However, when we approximate it by truncating, its derivative goes to ∞. Therefore frequency variance becomes ∞ and time bandwidth product also becomes ∞.