



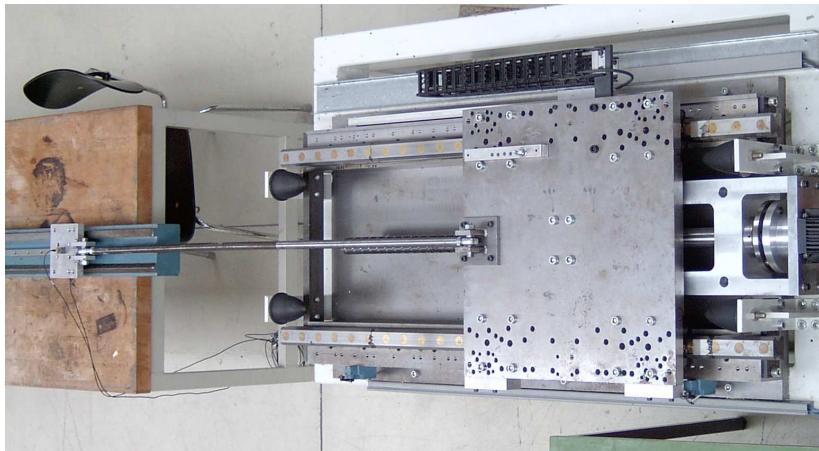
Zustandsüberwachung an Linearführungen

Ludger Prünte

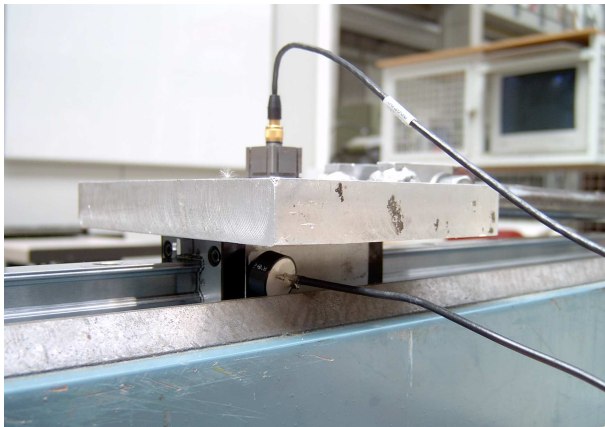
Zentrum für Technomathematik
Universität Bremen

04. November 2005

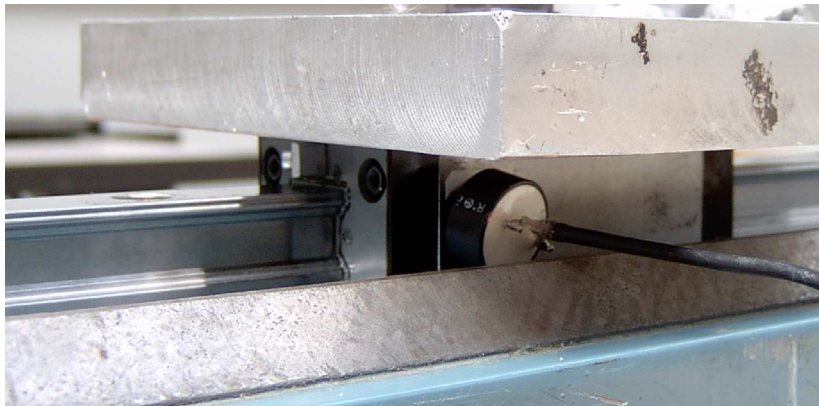
Technischer Hintergrund



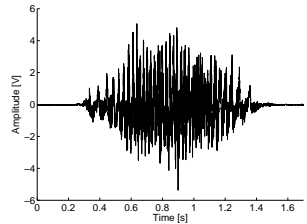
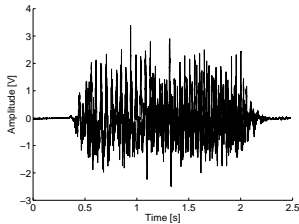
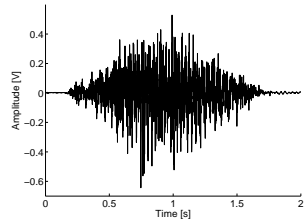
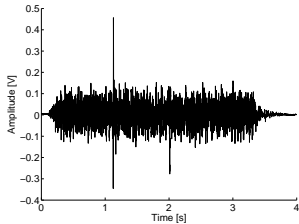
Technischer Hintergrund



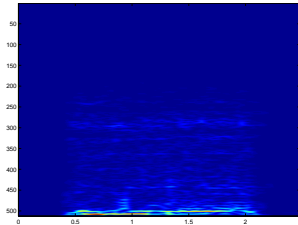
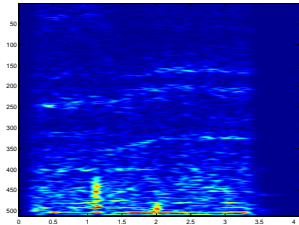
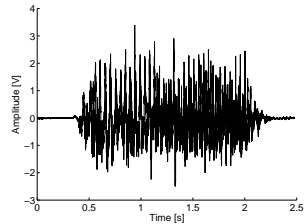
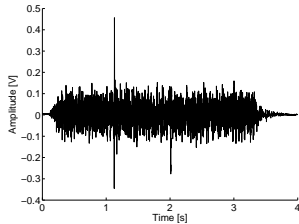
Technischer Hintergrund



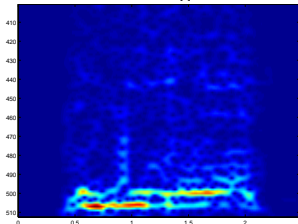
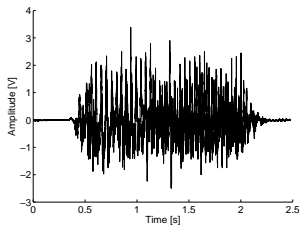
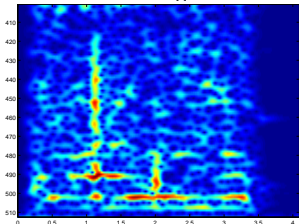
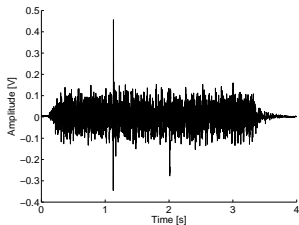
Messdaten



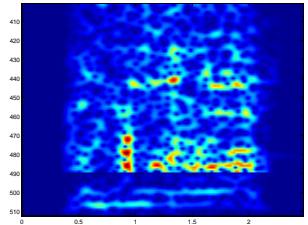
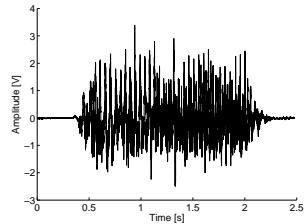
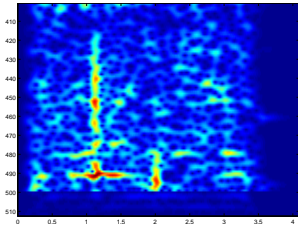
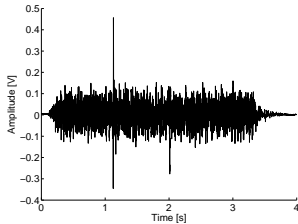
Gabor-Transformierte



Gabor-Transformierte



Gabor-Transformierte





Extraktion des Patterns

Zur Isolation des Patterns:

- soft wavelet-shrinkage der Daten



Extraktion des Patterns

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- soft wavelet-shrinkage der Daten
- benutzen von „cycle spinning“



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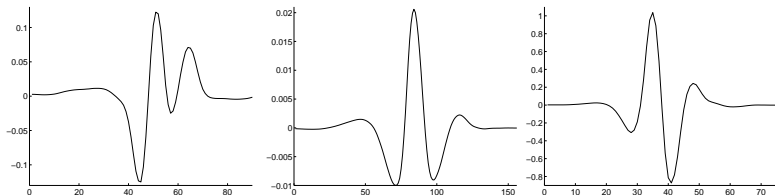
- soft wavelet-shrinkage der Daten
- benutzen von „cycle spinning“
- Durchschnitt über 3 Wavelets

Extraktion des Patterns

Zur Isolation des Patterns:

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Problem: Extreme Abhängigkeit vom Messpunkt





Lifting

Ziel: Finden eines Wavelets ψ , dass dem Pattern P möglichst ähnlich ist:

$$\operatorname{argmin}_{\psi} \|\psi - P\|_2$$

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Danach diskrete Wavelettransformation mit ψ zum Auffinden der Schäden

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$$\operatorname{argmin}_{\psi} \|\psi - P\|_2$$

Danach diskrete Wavelettransformation mit ψ zum Auffinden der Schäden

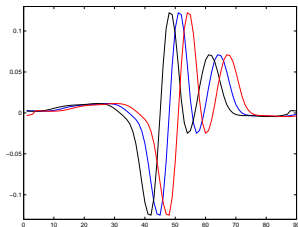
Methode (Vorgeschlagen von H. Thielemann): Lifting: Für ein biorthogonales Wavelet ψ und eine endliche Folge s ist auch

$$\psi_1 = \psi - \sum_{k \in \mathbb{Z}} s_k \phi(\cdot - k)$$

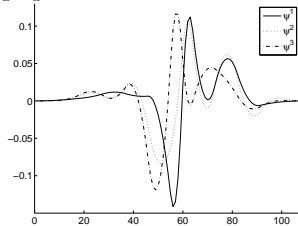
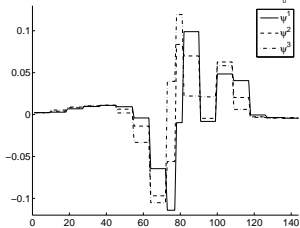
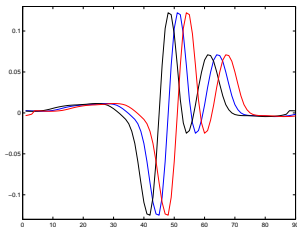
ein biorthogonales Wavelet.



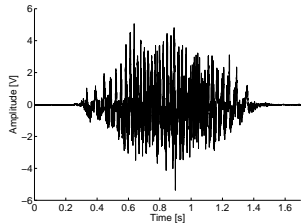
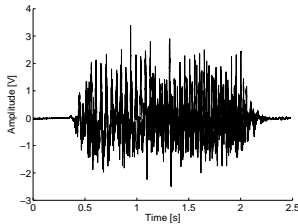
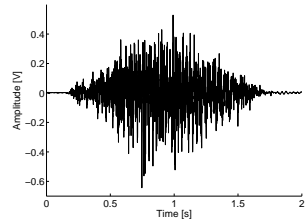
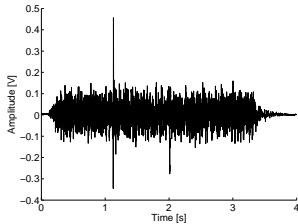
Wavelet-Anpassung



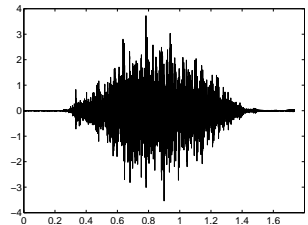
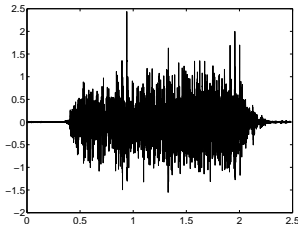
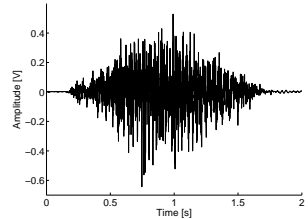
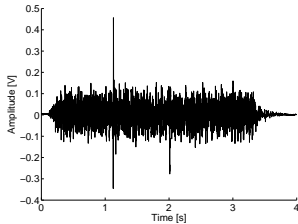
Wavelet-Anpassung



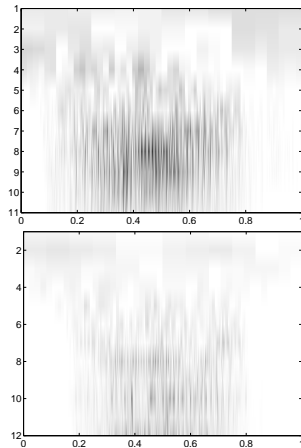
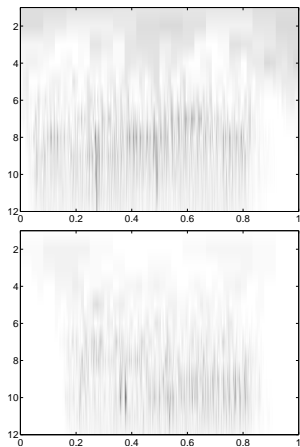
Messdaten (wdh.)



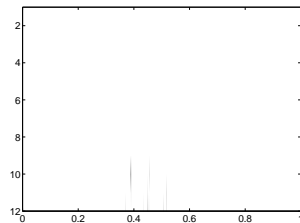
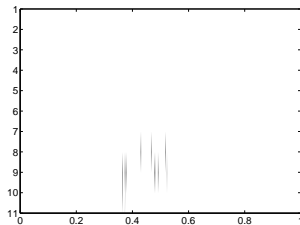
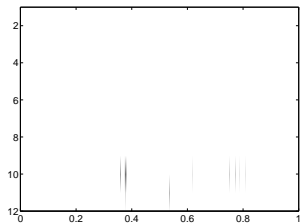
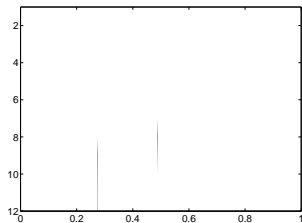
Messdaten (wdh.)



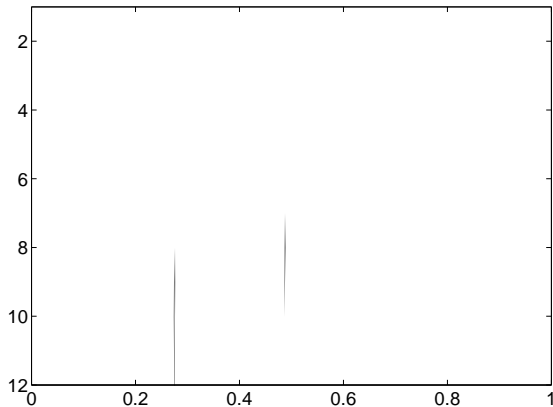
Transformierte



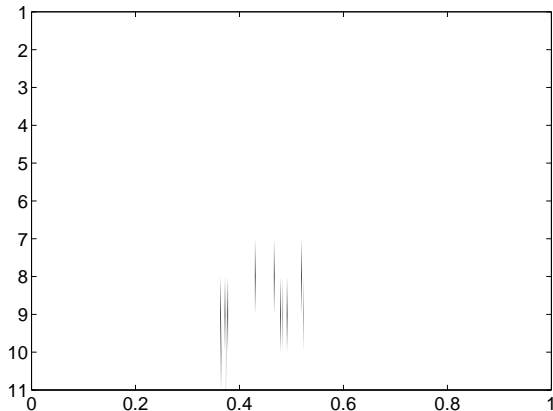
Ergebnis



Ergebnis

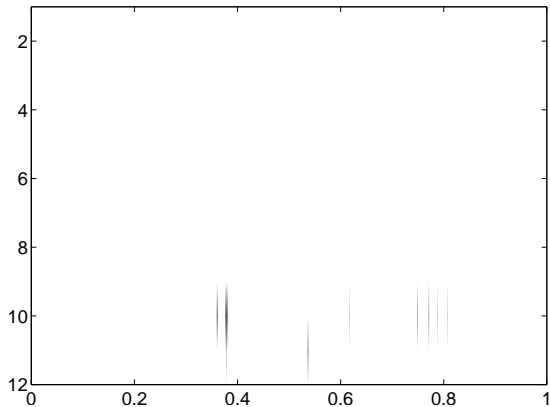


Ergebnis





Ergebnis





Ergebnis

