User Tuneable Sound Zones

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Motivation – Sound zones

English zone

Danish zone
Motivation – Sound zone control
Motivation – Sound zone control

AC: Acoustic Contrast  SD: Signal Distortion  ER: Energy Reduction
TIR: Target-to-Interferer Ratio

the variable span trade-off (VAST) filter
Optimization problems

• We pose different optimization problems depending on the constraint

• **ER (Energy Reduction) constraint**
  
  Minimize $SD$ with a constraint on $ER$

• **SD (Signal Distortion) constraint**
  
  Maximize $ER$ with a constraint on $SD$

• **AC (Acoustic Contrast) constraint**
  
  Minimize $SD$ with a constraint on $AC$

• **TIR (Target-to-Interferer Ratio) constraint**
  
  Minimize $SD$ with a constraint on $TIR$

<table>
<thead>
<tr>
<th>AC:</th>
<th>Acoustic Contrast</th>
<th>SD:</th>
<th>Signal Distortion</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIR:</td>
<td>Target-to-Interferer Ratio</td>
<td>ER:</td>
<td>Energy Reduction</td>
</tr>
</tbody>
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User Tuneable Sound Zones Demo
Perceptually Optimized Sound Zones

• Sound zones can be generated in a perceptually optimized way.

• The interference in a given zone is perceptually shaped so that it becomes less audible or ideally inaudible.

• The details can be found from:

Perceptually Optimized Sound Zones Demo
Thanks for your attention

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https://audio.create.aau.dk/

https://www.youtube.com/channel/UCB7oH9S8r3upDrvovOVAUoQ