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Adaptive lookahead planning for performing music composition

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Context

• Creating music amounts to write (compose) and perform (live)
• Composition can last an indefinite time
• Performance has a timeline defined during composition

Adaptive lookahead (dynamic vs. static)

<table>
<thead>
<tr>
<th>Dynamic object</th>
<th>Static object</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Dynamic object" /></td>
<td><img src="image" alt="Static object" /></td>
</tr>
<tr>
<td>likely to be modified while being rendered</td>
<td>will never change</td>
</tr>
</tbody>
</table>

Compositional processes that generate or modify musical structures can be integrated in musical objects, and occur during the performance.

Planning of a musical object

![Planning of a musical object](image)

Dynamic lookahead extension

Plan « just in time » in a time-window

![Plan « just in time » in a time-window](image)

Possibility to extend this time-window

![Possibility to extend this time-window](image)

Planning and scheduling operation scheme

Data structure

![Data structure](image)

Environment & Compositional Processes

• Computer-music environment: react to user inputs
• Process tasks: non preemptible, best-effort
• Integrate results in the data structure
• Notify the planner about editions

Planner

• Register playing objects
• Store time-windowed plans
• Extract new plans from the data structure according to queries or notifications

Scheduler

• Synchronously render plans
• Query the planner for new plans after depletion
• Trigger compositional processes as « tasks »
• Time updates (graphics, callbacks etc.)

Example

![Example](image)

Tasks triggering compositional processes

1 2 3 : Results of compositional processes

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