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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

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

Adaptive lookahead (dynamic vs. static)

Dynamic object
Static object

likely to be modified while being rendered
will never change

Planning of a musical object

Dynamic lookahead extension

Plan « just in time » in a time-window
Possibility to extend this time-window

short anticipation
larger anticipation

Planning and scheduling operation scheme

Data structure

Planner

Scheduler

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

Data structure

object to plan
translation

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

Tasks triggering compositional processes

1 2 3 Results of compositional processes

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