Electric piano

ICCP 2015

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Outline

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The wave equation

$$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2} - \kappa^2 \frac{\partial^4 y}{\partial x^4} - 2b_1 \frac{\partial y}{\partial t} + 2b_2 \frac{\partial^3 y}{\partial x^2 \partial t}$$

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$$y_n^{t+1} = a_1 \left(y_{n+2}^t + y_{n-2}^t \right) + a_2 \left(y_{n+1}^t + y_{n-1}^t \right) + a_3 y_n^t$$
$$+ a_4 y_n^{t-1} + a_5 \left(y_{n+1}^{t-1} + y_{n-1}^{t-1} \right)$$

Hammer strike

Damper simulation

Cutoff sounds unnatural

Damper simulation

Cutoff sounds unnatural $\rightarrow$add damper suppression

Damper simulation

Cutoff sounds unnatural→ add damper suppression
Increase stiffness

Damper simulation

VERGELIJKINGSPLAATJES

Examples

Time for some 'music'!

Considerations

- Add more notes

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- Real-time playback
- Simulate multiple strings with slightly different parameters

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Summary

End of the beamer demo
with a *tidy* TU Delft lay-out.
Thank you!