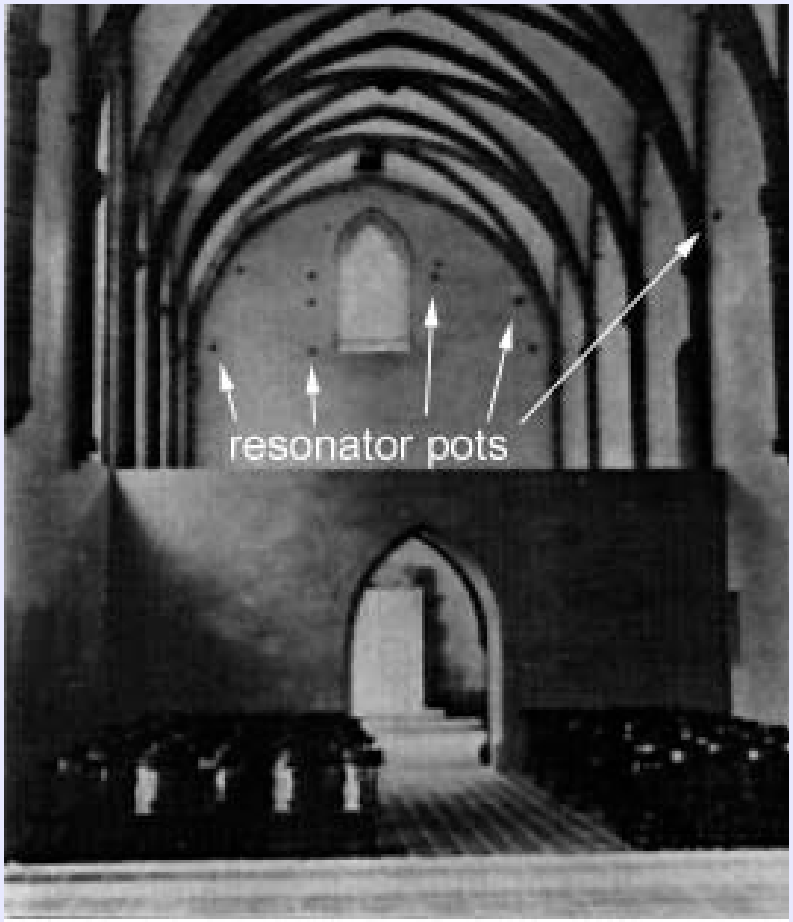
心理 生理與音響

- 聲場品質之心理主觀判斷
  (Sound quality of subjective preference)
- 四個物理量
  (Physical factors in a sound field)
- 聲場物理量模擬與設計
  (Simulation and design of a concert hall)
- 聲場之生理調查方法
  (Criteria of sound field by physiological tools)
- 聲場設計之訴求
  (Demands on sound fields design)

聲場品質的主觀判斷－語意差法

語意差法 (semantic difference)

- 音響清晰性 (definition)
- 透明感 (liveness)
- 殘響感 (中音域之殘響 warmth)
- 親密度或臨場感 (intimacy or presence)
- 音色 (tone color)
- 擴散性 (diffusion)



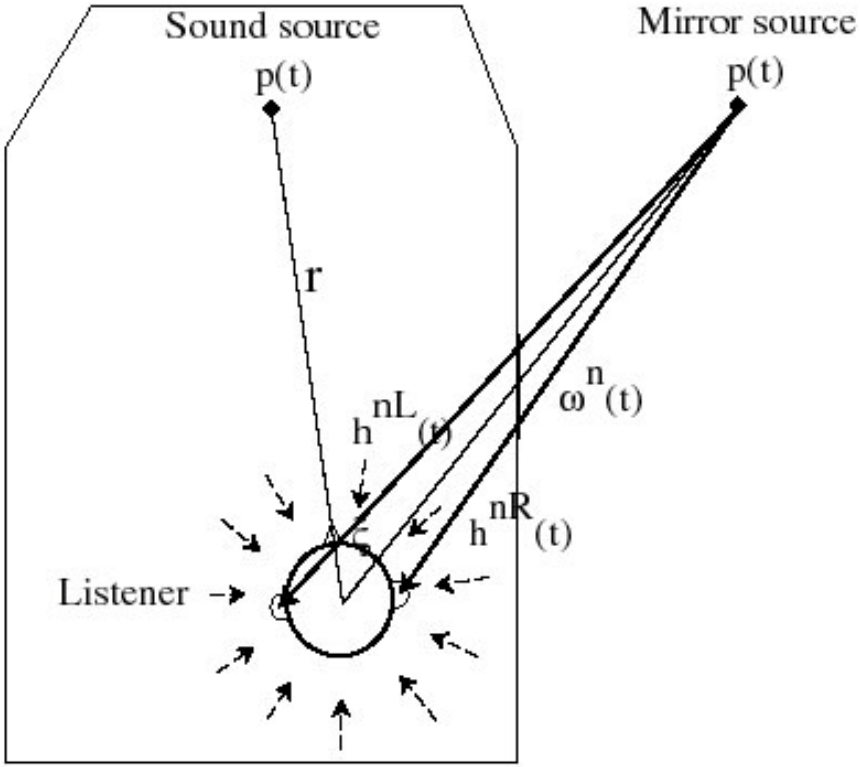
Pleterje chapel, near Ljubljana, built in 1403.

四個物理量

- 第一反射遲延
- 後續殘響時間
- 聽取聲壓級
- 雙耳相關函數級數

The sound pressures at both ears are

$$f_{L,R}(t) = \sum_n p(t) * A_n \omega_n (t - \Delta t_n) * h_{nL,R}(t)$$



(1) Initial time delay gap between the direct sound and the first reflection, Δt_1, n = 1;

(2) Subsequence reverberation time, T_{sub}, $n \geq 3$;

(3) Listening level, LL;

(4) Magnitude of interaural cross-correlation, IACC.

日本鹿島建設無響室聲場模擬

一般化聲場之要求

- 殘響時間(**Reverberation time**)

Tsub = 2.5 sec
4.1 sec
0.9 sec

- 語音清晰度(**Speech Intelligibility**)

RASTI = 0.1 ～ 0.3
0.5 ～ 0.7

- 聲壓分布(**Sound pressure distribution**)

L.Lmax – L.Lmin = ± 5 dB