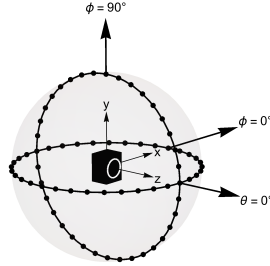


Calculate power response of a loudspeaker

Calculate approximate power response of a loudspeaker using SPL response on a sphere around the loudspeaker. The SPL responses $H_{m,n}$ are measured on two orbits as shown in the figure below ($m = 1$ for the vertical orbit, $m = 2$ for the horizontal orbit). There are N equally spaced points on each orbit ($n = 1 \dots N$).



The power response (PR) is the sound power summed over the sphere. If w_n is the portion of the sphere surface covered by each point (m, n), the summed power is:

$$PR = 10 \log_{10} \left(\sum_{m=1}^2 \sum_{n=1}^N w_n |H_{m,n}|^2 \right)$$

Note: $H_{m,n}$ is the SPL response at point (m, n), in linear units (not dB).

Further reading: https://www.princeton.edu/3D3A/Publications/Tylka_3D3A_DICalculation.pdf