

Model

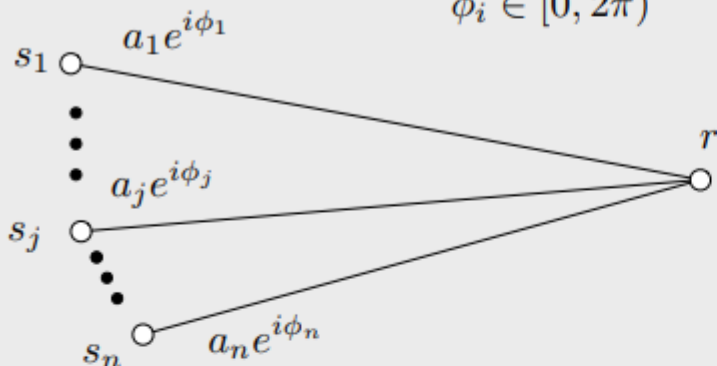
Senders $s_i \in \mathbb{R}^3$

$$a_i \in \mathbb{R}$$

$$\phi_i \in [0, 2\pi)$$

Receiver $r \in \mathbb{R}^3$

$$\|r - s_j\| \geq 1$$



Signal at receiver r

$$\sum_{j=1}^n \frac{a_j e^{i(\phi_j - \frac{2\pi}{\lambda} (\|r - s_j\|_2))}}{(\|r - s_j\|_2)^{\alpha/2}} \sin^2(\theta(r - s_j))$$

Parameters:

$$\alpha \in [1, \dots, 6] \quad \text{path loss (default 2)}$$

$$\lambda \in \mathbb{R}^+ \quad \text{wavelength (default 1)}$$

where

$$\sin(v_x, v_y, v_z) = \frac{\sqrt{v_x^2 + v_y^2}}{\sqrt{v_x^2 + v_y^2 + v_z^2}}$$

Algorithms

Supernova

$$a_j = 1 \quad \phi_j = \frac{2\pi}{\lambda} \|s_j\|_2$$

Avonrepus

$$a_j = 1 \quad \phi_j = -\frac{2\pi}{\lambda} \|s_j\|_2$$

Parametrized Supernova

$$b \in \mathbb{R}$$

$$a_j = 1 \quad \phi_j = b \cdot \frac{2\pi}{\lambda} \|s_j\|_2$$