Model

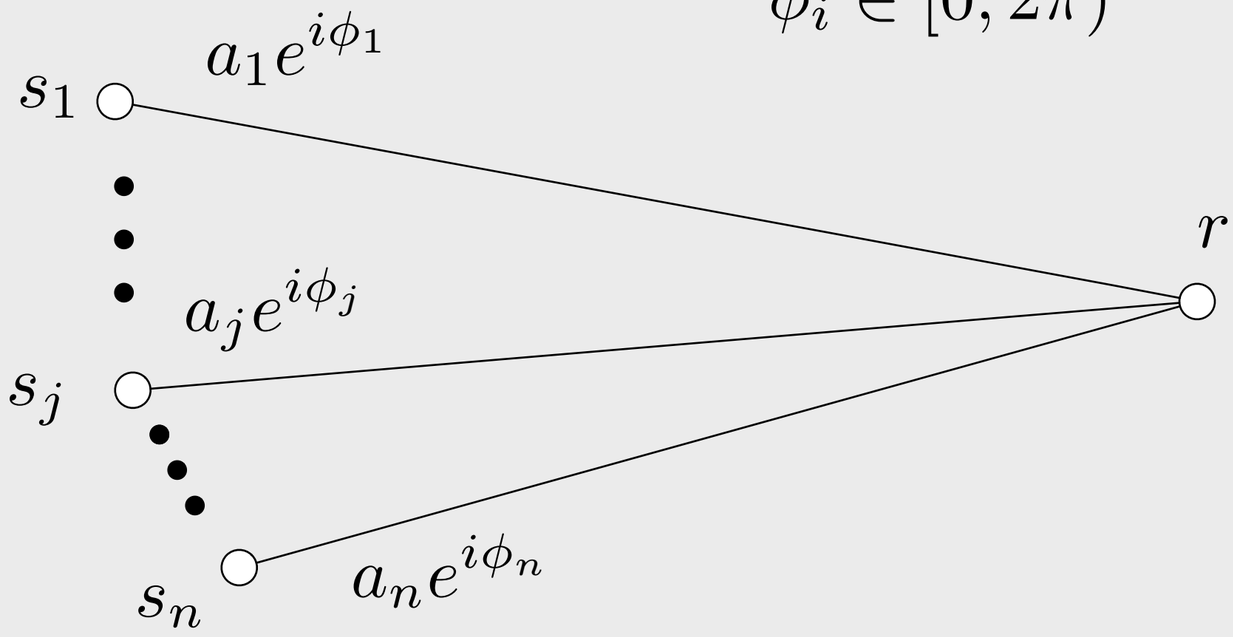
Senders $s_i \in \mathbb{R}^3$

$a_i \in \mathbb{R}$

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

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

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



Signal at receiver r

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

Parameters:

$\alpha \in [1, \ldots, 6]$ path loss (default 2)

$\lambda \in \mathbb{R}^+$ 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

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

Avonrepus

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

Parametrized Supernova

$b \in \mathbb{R}$

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