

Mathematical Model for Accessibility of Extraterrestrial Civilizations

Problem	Drake Equation → Search for Extraterrestrial Intelligence	These models lack... <u>Accessibility</u>
How can the accessibility of an extraterrestrial civilization be approximated to improve SETI yields?		
Time Window to Emit Signals	Cosmological Kinematics $D = aR$ $v = \dot{a}R$ $D = c\Delta t$	$L_S \leq t_{sent} + \frac{aR_{sent}}{c - \dot{a}} < L_E$
Change in frequency	Relativistic Doppler Effect $f_0 \sqrt{\frac{1 - (v/c)}{1 + (v/c)}} = f$	$f = f_0 \sqrt{\frac{c - \dot{a}R}{c + \dot{a}R}}$
Access to frequencies	Cocconi & Morrison (1959) $f_{ideal} = W \cdot fS$	$W \cdot fS \pm E = f_0 \left(1 - \frac{\dot{a}D}{c}\right) + \sum_n^{A(S)} S_n E \leq \Xi$

Extended Model

$$\Omega_N = \Omega_A * N = v(f_0) \cdot [1 - \kappa E] * |v(t_{sent})| * N$$

Implications

Look for areas where:

- Higher range of frequencies available
- More similar frequencies available
- Closer distances
- Less unpredictable highly interfering objects

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