Changing the Radio Station

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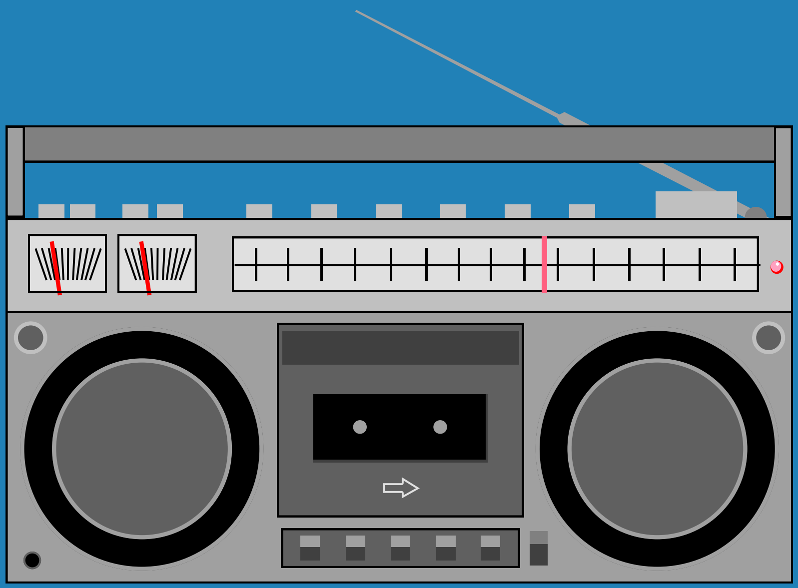
Radio Signals



- Radio Signals
- Stations : $S_1, S_2, ..., S_x$
- $f_1(t) + f_2(t) + ... + f_x(t)$

Station Signals

- h(t)*sin(nt)
- AM signal = h(t)
- carrier signal = Sin(nt)

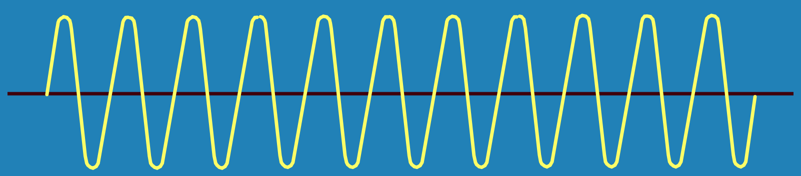
Types of Signals

- AM Signals
- $S_1 = 3\sin(nt) - 2\sin(2t)$
- $S_2 = 5\sin(nt) - 6\sin(2t)$
- $S_3 = 4\sin(nt) - 7\sin(2t)$

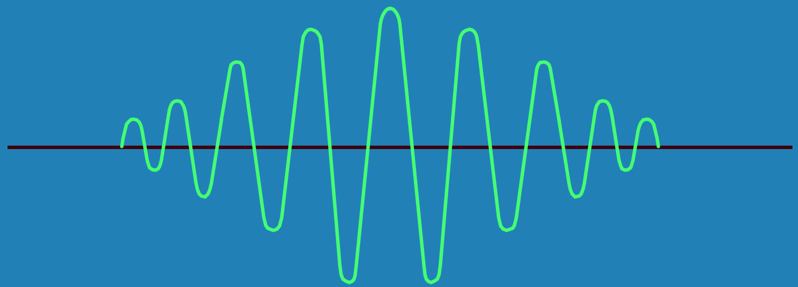
- Carrier Signals
- $S_1 = \sin(8t)$
- $S_2 = \sin(16t)$
- $S_3 = \sin(24t)$

Complete Signals

- S_1 = (3sint - 2sin(2t)) *(sin(8t))



- S_2 = (5sint - 6sin(2t))* (sin(16t))



- S_3 = (4sint - 7sin(2t))* (sin(24t))

Computation

- $f(t) = S_1 + S_2 + S_3$

$$\int_0^{\Pi} f(t) * \cos(17t)\,dt$$

$$\int_0^{\Pi} f(t) * \cos(18t)\,dt$$

Generalized Solution

$$\int_{0}^{\Pi} f(t) * \cos(n + p) \; dt$$

Jean Baptiste Joseph Fourier

- Heat Flow
- Spatial Rate

Spatial Rate of Change

- Heat conductivity of the object
- Initial temperature distribution on the object's boundary
- Object's geometric shape

Fourier Series

- $h(t) = a_1\sin(t) + a_2\sin(2t) + a_3\sin(3t) + \ldots$

- Fourier Sine Series
- Fourier Cosine Series
- Complete Fourier Series

Computation

$$\int_0^{\Pi} h(t) * \sin(nt) dt$$

$$= a_n * \int_0^{\Pi} \sin^2(nt)\ dt$$

$$A_n = \frac{2}{\Pi} \int_0^{\Pi} h(t) * Sin(nt)\ dt$$

$$= a_n * \frac{\Pi}{2}$$

Summary

- Terms in a Fourier Series
- Trigonomic Functions with Calculus
- Applications in other fields