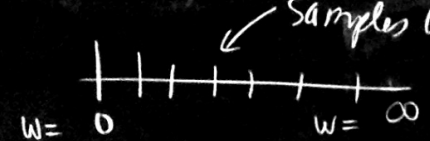
Superposition



Can't use $\sum$

add $T(t)X(x) = e^{-\omega^2 kt}\left(A(\omega)\cos(\omega x) + B(\omega)\sin(\omega x)\right)$

$0 \le \omega < \infty$

$$u(x,t) = \sum \text{prod sols} = \sum_n e^{-\omega_n^2 kt}\left(A(\omega_n)\cos(\omega_n x) + B(\omega_n)\sin(\omega_n x)\right)\Delta\omega_n \cong \int_{\omega=0}^{\omega=\infty} e^{-\omega^2 kt}\left(A(\omega)\cos(\omega x) + B(\omega)\sin(\omega x)\right)d\omega$$

$$f(x) = u(x,0) = \int_0^\infty \left(A(\omega)\cos(\omega x) + B(\omega)\sin(\omega x)\right)d\omega$$