

Superposition



Can't use $\sum$

$$\text{add } T(t)X(x) = e^{-w^2 kt} \left(A(w) \cos(wx) + B(w) \sin(wx) \right) \\ 0 \leq w < \infty$$

$$u(x,t) = \sum \text{prod sols} = \sum_n e^{-w_n^2 kt} (A(w_n) \cos(w_n x) + B(w_n) \sin(w_n x)) \Delta w_n \approx \int_{w=0}^{w=\infty} e^{-w^2 kt} (A(w) \cos(wx) + B(w) \sin(wx)) dw$$

$$f(x) = u(x,0) = \int_0^\infty (A(w) \cos(wx) + B(w) \sin(wx)) dw \quad \text{Fourier Integral Theorem}$$