restart;

> de1 := diff(X(x), x$2) + κ^2 · X(x) = 0;

\[
de1 := \frac{d^2}{dx^2} X(x) + \kappa^2 \cdot X(x) = 0
\]  

(1)

> s1 := dsolve(de1, X(x));

\[
s1 := X(x) = _C1 \sin(\kappa x) + _C2 \cos(\kappa x)
\]  

(2)

> de2 := diff(Gamma(t), t) + alpha · κ^2 · Gamma(t) = 0;

\[
de2 := \frac{d}{dt} \Gamma(t) + \alpha \kappa^2 \Gamma(t) = 0
\]  

(3)

> s2 := dsolve(de2, Gamma(t));

\[
s2 := \Gamma(t) = _C1 e^{-\alpha \kappa^2 t}
\]  

(4)

> N := 100, xs := 0.01;

\[
N := 100
\]

xs := 0.01  

(5)

> for i from 1 to N do kappa[i] := \( \frac{(2 \cdot i - 1) \cdot \pi}{2 \cdot xs} \) od;

> c[n] := \frac{\text{int}(T0 \cdot \cos(\kappa[n] \cdot x), x = 0..xs)}{\text{int}(\cos(\kappa[n] \cdot x)^2, x = 0..xs)}

\[
c_n := \frac{20000.00000 \cdot \sin(0.01000000000 \cdot \kappa_n)}{100. \cdot \cos(0.01000000000 \cdot \kappa_n) \cdot \sin(0.01000000000 \cdot \kappa_n) + \kappa_n}
\]  

(6)

> T := \text{sum}(c[n] \cdot \cos(\kappa[n] \cdot x) \cdot \exp(-alpha \cdot \kappa[n]^2 \cdot t), n = 1..N);

> T0 := 100; k := 42; rho := 8100; Cp := 500; alpha := \frac{k}{rho \cdot Cp};

\[
T0 := 100
\]

\[
k := 42
\]

\[
rho := 8100
\]

\[
Cp := 500
\]

\[
alpha := \frac{7}{675000}
\]  

(7)

> plot(Tcl, t = 0..30);
\texttt{evalf(subs(t = 10, Tcl))};\quad 9.854698380

\texttt{plot3d(T, x = 0..xs, t = 0..30);}
plot(\texttt{subs}(t = 0, T), x = 0 .. xs);