Using Laplace Transforms, solve the following initial value problem:

\[ x''(t) + 4x(t) = \sin(3t); \ x(0) = 0, \ x'(0) = 0. \]

As a first step we need to take the Laplace Transform of both sides of the equation. Since on the left side, properties of the transform have to be applied, this can be done only through pencil and paper to obtain

\[ (s^2X(s) - 2s + 1) - (sX(s) - 2) - 6X(s) = 0, \]

where \( X(s) \) denote the Laplace Transform of \( x(t) \).