[gex120] PDEs solved and solutions visualized

The two 2$^{\text{nd}}$-order PDEs with boundary conditions as stated,

$$u_{yy} = x^2 \cos y, \quad u(x,0) = 0, \quad u(x, \pi/2) = 0, \tag{1}$$

$$u_{xy} = 4xy + e^x, \quad u_y(0,y) = y, \quad u(x,0) = 2, \tag{2}$$

are both well-posed PDE problems.

(a) Use the DSolve command of Mathematica to find the unique solution of both cases.

(b) Produce a graph of the solution of (1) for $-1 < x < 1$, $0 < y < \pi/2$ using DensityPlot.

(c) Produce a graph of the solution of (2) for $-1 < x < 1$, $-1 < y < 1$ using ContourPlot.

Solution: