

## Exercise 6

Solve the following Neumann problem in the cube  $\{0 < x < 1, 0 < y < 1, 0 < z < 1\}$ :  $\Delta u = 0$  with  $u_z(x, y, 1) = g(x, y)$  and homogeneous Neumann conditions on the other five faces, where  $g(x, y)$  is an arbitrary function with zero average.