

Решить задачу Штурма-Лиувилля $\Delta u + \lambda u = 0$ для прямоугольника (найти собственные значения, собственные функции и квадрат нормы) с граничными условиями:

1. $u(0, y) = 0, \quad u_x(5, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 3) = 0.$
2. $u_x(0, y) = 0, \quad u(6, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 4) = 0.$
3. $u(0, y) = 0, \quad u_x(7, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 5) = 0.$
4. $u_x(0, y) = 0, \quad u(8, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 6) = 0.$
5. $u(0, y) = 0, \quad u_x(9, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 3) = 0.$
6. $u_x(0, y) = 0, \quad u(4, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 2) = 0.$
7. $u(0, y) = 0, \quad u_x(9, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 5) = 0.$
8. $u_x(0, y) = 0, \quad u(6, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 2) = 0.$
9. $u(0, y) = 0, \quad u_x(7, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 3) = 0.$
10. $u_x(0, y) = 0, \quad u(8, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 4) = 0.$
11. $u(0, y) = 0, \quad u_x(3, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 5) = 0.$
12. $u_x(0, y) = 0, \quad u(4, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 6) = 0.$
13. $u(0, y) = 0, \quad u_x(5, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 7) = 0.$
14. $u_x(0, y) = 0, \quad u(6, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 8) = 0.$
15. $u(0, y) = 0, \quad u_x(3, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 9) = 0.$
16. $u_x(0, y) = 0, \quad u(2, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 4) = 0.$
17. $u(0, y) = 0, \quad u_x(5, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 9) = 0.$
18. $u_x(0, y) = 0, \quad u(2, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 6) = 0.$
19. $u(0, y) = 0, \quad u_x(3, y) = 0, \quad u_y(x, 0) = 0, \quad u(x, 7) = 0.$
20. $u_x(0, y) = 0, \quad u(4, y) = 0, \quad u(x, 0) = 0, \quad u_y(x, 8) = 0.$