Individual task 3

Fredholm integral equations. Part II

Case 1

1. Using the Fredholm determinants method with help of recurrence relations
   $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = x + s + 1;$ $\quad -1 \le x \le 1,$ $\quad -1 \le s \le 1.$
   1.2. $K(x,s) = 1 + 3xs;$ $\quad 0 \le x \le 1,$ $\quad 0 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x+s)\varphi(s)ds = 1.$
   2.2. $\varphi(x) - \lambda\int_0^1 (2x - s)\varphi(s)ds = \frac{x}{6}.$

Individual task 3

Fredholm integral equations. Part II

Case 2

1. Using the Fredholm determinants method with help of recurrence relations
   $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = 4xs - x^2;$ $\quad -1 \le x \le 1,$ $\quad -1 \le s \le 1.$
   1.2. $K(x,s) = e^{x-s};$ $\quad -1 \le x \le 1,$ $\quad -1 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x)\cos(s)\,\varphi(s)ds = \cos(2x).$
   2.2. $\varphi(x) + \int_0^1 e^{x-s}\varphi(s)ds = e^x.$

Individual task 3

Fredholm integral equations. Part II

Case 3

1. Using the Fredholm determinants method with help of recurrence relations
   $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = x + s + 1;$ $\quad -1 \le x \le 1,$ $\quad -1 \le s \le 1.$
   1.2. $K(x,s) = \sin(x+s)$ $\quad 0 \le x \le 2\,\pi,$ $\quad 0 \le s \le 2\,\pi.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) + \int_0^1 e^{x-s}\varphi(s)ds = e^x.$
   2.2. $\varphi(x) - \lambda\int_0^1 (4xs - x^2)\varphi(s)ds = x.$

Individual task 3

Fredholm integral equations. Part II

Case 4

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = 2x - s;$ $0 \le x \le 1,$ $0 \le s \le 1.$
   1.2. $K(x,s) = \sin(x)\cos(s)$ $0 \le x \le 2\pi,$ $0 \le s \le 2\pi.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x+s)\varphi(s)ds = 1.$
   2.2. $\varphi(x) - \lambda\int_0^1 (4xs - x^2)\varphi(s)ds = x.$

Individual task 3

Fredholm integral equations. Part II

Case 5

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = 1 + 3xs;$ $0 \le x \le 1,$ $0 \le s \le 1.$
   1.2. $K(x,s) = e^{x-s};$ $-1 \le x \le 1,$ $-1 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^1 (2x - s)\varphi(s)ds = \frac{x}{6}.$
   2.2. $\varphi(x) + \int_0^1 e^{x-s}\varphi(s)ds = e^x.$

Individual task 3

Fredholm integral equations. Part II

Case 6

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = x + s + 1;$ $-1 \le x \le 1,$ $-1 \le s \le 1.$
   1.2. $K(x,s) = x^2 s - xs^2;$ $0 \le x \le 1,$ $0 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x+s)\varphi(s)ds = 1.$
   2.2. $\varphi(x) + \int_0^1 e^{x-s}\varphi(s)ds = e^x.$

Individual task 3

Fredholm integral equations. Part II

Case 7

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = \sin(x) - \sin(s)$ $\quad 0 \le x \le 2\pi,$ $\quad 0 \le s \le 2\pi.$
   1.2. $K(x,s) = 1 + 3xs;$ $\quad 0 \le x \le 1,$ $\quad 0 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x)\cos(s)\,\varphi(s)ds = \cos(2x).$
   2.2. $\varphi(x) - \lambda\int_0^1 (4xs - x^2)\varphi(s)ds = x.$

Individual task 3

Fredholm integral equations. Part II

Case 8

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = x \cdot s;$ $\quad 0 \le x \le 1,$ $\quad 0 \le s \le 1.$
   1.2. $K(x,s) = e^{x-s};$ $\quad -1 \le x \le 1,$ $\quad -1 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^1 (2x - s)\varphi(s)ds = \frac{x}{6}.$
   2.2. $\varphi(x) - \lambda\int_0^1 (4xs - x^2)\varphi(s)ds = x.$

Individual task 3

Fredholm integral equations. Part II

Case 9

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = 4xs - x^2;$ $\quad -1 \le x \le 1,$ $\quad -1 \le s \le 1.$
   1.2. $K(x,s) = e^{x-s};$ $\quad -1 \le x \le 1,$ $\quad -1 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x+s)\varphi(s)ds = 1.$
   2.2. $\varphi(x) + \int_0^1 e^{x-s}\varphi(s)ds = e^x.$

Individual task 3

Fredholm integral equations. Part II

Case 10

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = 4xs - x^2$; $-1 \le x \le 1,$ $-1 \le s \le 1.$
   1.2. $K(x,s) = e^{x-s}$; $0 \le x \le 1,$ $0 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x)\cos(s)\,\varphi(s)ds = \cos(2x).$
   2.2. $\varphi(x) - \lambda\int_0^1 (4xs - x^2)\varphi(s)ds = x.$

Individual task 3

Fredholm integral equations. Part II

Case 11

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = x \cdot s + s^2$; $0 \le x \le 1,$ $0 \le s \le 1.$
   1.2. $K(x,s) = e^{x-s}$; $-1 \le x \le 1,$ $-1 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x)\cos(s)\,\varphi(s)ds = \cos(2x).$
   2.2. $\varphi(x) - \lambda\int_0^1 (4xs - x^2)\varphi(s)ds = x.$

Individual task 3

Fredholm integral equations. Part II

Case 12

1. Using the Fredholm determinants method with help of recurrence relations $B_n(x,s) = C_n K(x,s) - n\int_a^b K(x,t)B_{n-1}(t,s)dt$ и $C_n = \int_a^b B_{n-1}(t,t)dt$, find the resolvent for kernels:
   1.1. $K(x,s) = 1 + 3xs$; $0 \le x \le 1,$ $0 \le s \le 1.$
   1.2. $K(x,s) = 4xs - x^2$; $-1 \le x \le 1,$ $-1 \le s \le 1.$
2. Solve the integral equations with help of resolvent:
   2.1. $\varphi(x) - \lambda\int_0^{2\pi} sin(x)\cos(s)\,\varphi(s)ds = \cos(2x).$
   2.2. $\varphi(x) + \int_0^1 e^{x-s}\varphi(s)ds = e^x.$