List of Boundary-value Problem (P2C) for 2D Cartesian Domains, for which the Green's Functions for Poisson's Equation have been derived

All these Green's functions can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

(P2C) ***1. Plane*** $(-\infty \le x_1, x_2 \le \infty)$

In this section formulates boundary-value Problem (P2C)s on constructing Green's functions G of Poisson equation for the plane

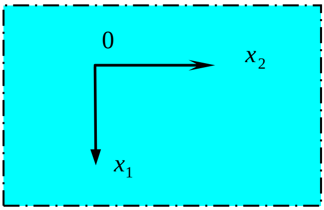

Figure 1: Plane in Cartesian co-ordinates.

Boundary-value Problem (P2C)

Let us consider the following boundary value Problem (P2C)s which consist from the Poisson equation

$$\nabla^2 G(x_1, \xi_1; x_2, \xi_2) = -\delta(x - \xi);$$
$$\nabla^2 U(x_1, x_2) = -f(x_1, x_2).$$

in the inner points of the plane. At infinity the functions G and U must vanish.

The Answer to the **Problem (P2C)** 1.1 for plane can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

(P2C) ***2. Half-plane*** $(0 \le x_1 \le \infty, -\infty \le x_2 \le \infty)$

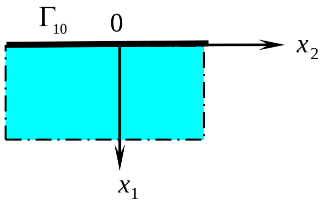

Figure 2: Half-plane with the boundary straight line Γ_{10} .

(P2C) Boundary-value Problems

Let us consider the following boundary value Problem (P2C)s which consist from the Poisson equation

$$\nabla^2 G(x_1, \xi_1; x_2, \xi_2) = -\delta(x - \xi);$$
$$\nabla^2 U(x_1, x_2) = -f(x_1, x_2)$$

in the inner points of the half-plane. On its boundaries are given the following boundary conditions:

Problem (P2C) 2.1 $\boxed{G^{(1)}(x, \xi) = 0;\ x_1 = 0; -\infty \le x_2 \le \infty; U(0, y_2) = s(0, y_2)}$

The Answer to Problem (P2C) 2.1 for half-plane (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 2.2

$$\frac{\partial}{\partial x_1} G^{(2)} = 0;\ x_1 = 0; -\infty \le x_2 \le \infty;$$
$$\partial U(0, y_2)/\partial n_1 = g(0, y_2)$$

The Answer to Problem (P2C) 2.2 for half-plane (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

(P2C) ***3. Quadrant*** $(0 \le x_1, x_2 \le \infty)$

In this section formulates four boundary-value Problems (P2C) on constructing Green's functions, $G^{(j)}$, j=1-4, of Poisson's equation for the quadrant

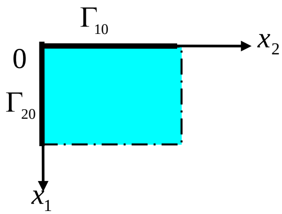

Figure 3: Quadrant with boundary half-straight lines Γ_{10} and Γ_{20} .

(P2C) 3.1. Boundary-value Problems and integral representation via Green's functions

Let us consider the following boundary value Problem (P2C)s which consist from the Poisson equation

$$\nabla^2 U(x_1, x_2) = -f(x_1, x_2) \tag{3.1}$$

in the inner points of the quadrant. On the boundaries are given two of the following four functions:

$$\partial U(0,y_2)/\partial n_1 = g_1(0,y_2) \ or \ U(0,y_2) = s_1(0,y_2);$$
$$\partial U(y_1,0)/\partial n_2 = g_2(y_1,0) \ or \ U(y_1,0) = s_2(y_1,0). \qquad (3.2)$$

The solutions of these boundary value Problem (P2C)s are expressed via respective Green functions in the form of following integral formula:

$$U(x_1,x_2) = \int_0^\infty\int_0^\infty f(\xi_1,\xi_2)G(x_1,\xi_1;x_2,\xi_2)d\xi_1 d\xi_2 +$$
$$\int_0^\infty \left[\frac{\partial U(0,y_2)}{\partial n_1}G(0,x_1;y_2,x_2) - U(0,y_2)\frac{\partial G(0,x_1;y_2,x_2)}{\partial n_1}\right]dy_2 + \qquad (3.3)$$
$$\int_0^\infty \left[\frac{\partial U(y_1,0)}{\partial n_2}G(y_1,x_1;0,x_2) - U(y_1,0)\frac{\partial G(y_1,x_1;0,x_2)}{\partial n_2}\right]dy_1.$$

In eq. (3.3) Green functions G and functions U satisfy Poisson equations

$$\nabla^2 G(x_1,\xi_1;x_2,\xi_2) = -\delta(x-\xi);$$
$$\nabla^2 U(x_1,x_2) = -f(x_1,x_2) \qquad (3.4)$$

and the following boundary conditions:

Problems (P2C) 3.1- (P2C) 3.4

And construct the Green's function $G^{(j)}(x,\xi)$, j=1–4 for Poisson's equation $\nabla^2 G(x,\xi) = -\delta(x-\xi)$ for the quadrant $(0 \le x_1 \le \infty,\ 0 \le x_2 \le \infty)$ under the following homogeneous boundary conditions

Problem (P2C) 3.1

$$\boxed{\begin{array}{l} G^{(1)} = 0; x_1 = 0,\ 0 \le x_2 \le \infty;\ U(0,y_2) = s_1(0,y_2); \\ G^{(1)} = 0;\ x_2 = 0,\ 0 \le x_1 \le \infty;\ U(y_1,0) = s_2(y_1,0). \end{array}}$$

The Answer to Problem (P2C) 3.1 for quadrant (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).

2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 3.2

$$\begin{array}{|l|}\hline \dfrac{\partial G^{(2)}}{\partial x_1}=0;\; x_1=0,\,0\le x_2\le\infty;\partial U(0,y_2)/\partial n_1=g_1(0,y_2);\\ \dfrac{\partial G^{(2)}}{\partial x_2}=0;\; x_2=0,\,0\le x_1\le\infty;\partial U(y_1,0)/\partial n_2=g_2(y_1,0).\\ \hline\end{array}$$

The Answer **to Problem (P2C) 3.2 for quadrant** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 3.3

$$\begin{array}{|l|}\hline G^{(3)}=0;\; x_1=0,\,0\le x_2\le\infty;\quad U(0,y_2)=s_1(0,y_2);\\ \dfrac{\partial G^{(3)}}{\partial x_2}=0;\; x_2=0,\,0\le x_1\le\infty;\partial U(y_1,0)/\partial n_2=g_2(y_1,0).\\ \hline\end{array}$$

The Answer **to Problem (P2C) 3.3 for quadrant** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 3.4

$$\frac{\partial G^{(4)}}{\partial x_1} = 0;\ x_1 = 0,\ 0 \le x_2 \le \infty;\ \partial U(0, y_2)/\partial n_1 = g_1(0, y_2);$$
$$G^{(4)} = 0;\ x_2 = 0,\ 0 \le x_1 \le \infty; U(y_1, 0) = s_2(y_1, 0).$$

The Answer **to Problem (P2C) 3.4 for quadrant** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

(P2C) ***4. Strip*** $(-\infty \le x_1 \le \infty, 0 \le x_2 \le a_2)$

In this Section for boundary-value Problem (P2C)s on constructing Green's function $G^{(j)}, (j = 1-4)$ of Poisson's equation for a strip are formulated

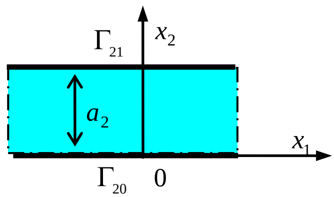

Figure 4: Strip with boundary straight lines Γ_{20} and Γ_{21}.

(P2C) 4.1. Boundary-value Problems and integral representation via Green's functions

Let us consider the following boundary value Problem (P2C)s which consist from the Poisson equation

$$\nabla^2 U(x_1, x_2) = -f(x_1, x_2) \tag{4.1}$$

in the inner points of the quadrant. On the boundaries are given two of the following four functions:

$$\partial U(y_1,0)/\partial n_2 = g_1(y_1,0) \ or \ U(y_1,0) = s_1(y_1,0);$$
$$\partial U(y_1,a_2)/\partial n_2 = g_2(y_1,a_2) \ or \ U(y_1,a_2) = s_2(y_1,a_2). \tag{4.2}$$

The solutions of these boundary value Problem (P2C)s are expressed via respective Green functions in the form of following integral formula:

$$U(x_1,x_2) = \int_{-\infty}^{\infty}\int_{0}^{\infty} f(\xi_1,\xi_2)G(x_1,\xi_1;x_2,\xi_2)d\xi_1 d\xi_2 +$$
$$\int_{-\infty}^{\infty}\left[\frac{\partial U(y_1,0)}{\partial n_2}G(y_1,x_1;0,x_2) - U(y_1,0)\frac{\partial G(y_1,x_1;0,x_2)}{\partial n_2}\right]dy_1.+ \tag{4.3}$$
$$\int_{-\infty}^{\infty}\left[\frac{\partial U(y_1,a_2)}{\partial n_2}G(y_1,x_1;a_2,x_2) - U(0,y_2)\frac{\partial G(y_1,x_1;a_2,x_2)}{\partial n_2}\right]dy_1$$

In eq. (4.3) Green functions G and functions U satisfy Poisson equations

$$\nabla^2 G(x_1,\xi_1;x_2,\xi_2) = -\delta(x-\xi);$$
$$\nabla^2 U(x_1,x_2) = -f(x_1,x_2) \tag{4.4}$$

and the following boundary conditions:

Problems (P2C) 4.1-(P2C) 4.4 with the answers

To construct the Green's function $G(x,\xi)$ for Poisson's equation $\nabla^2 G(x,\xi) = -\delta(x-\xi)$ for the strip $(-\infty \le x_1 \le \infty, 0 \le x_2 \le a_2)$ under the following conditions

Problem (P2C) 4.1

$G^{(1)} = 0;\ x_2 = 0,, -\infty \le x_1 \le \infty;\ U(y_1,0) = s_1(y_1,0);$
$G^{(1)} = 0;\ x_2 = a_2 - \infty \le x_1 \le \infty; U(y_1,a_2) = s_2(y_1,a_2).$

The Answer **to Problem (P2C) 4.1 for strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).

2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 4.2

$$\frac{\partial G^{(2)}}{\partial x_2} = 0; x_2 = 0, -\infty \le x_1 \le \infty; \partial U(y_1, 0)/\partial n_2 = g_1(y_1, 0)$$
$$\frac{\partial G^{(2)}}{\partial x_2} = 0; x_2 = a_2, -\infty \le x_1 \le \infty; \ \partial U(y_1, a_2)/\partial n_2 = g_2(y_1, a_2).$$

The Answer **to Problem (P2C) 4.2 for strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 4.3

$$\frac{\partial G^{(3)}}{\partial x_2} = 0; x_2 = 0, -\infty \le x_1 \le \infty; \partial U(y_1, 0)/\partial n_2 = g_1(y_1, 0)$$
$$G^{(3)} = 0; \ x_2 = a_2, -\infty \le x_1 \le \infty; U(y_1, a_2) = s_2(y_1, a_2).$$

The Answer **to Problem (P2C) 4.3 for strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 4.4

$$G^{(4)}=0; x_2=0, -\infty\le x_1\le\infty; U(y_1,0)=s_1(y_1,0);$$
$$\frac{\partial G^{(4)}}{\partial x_2}=0;\ x_2=a_2, -\infty\le x_1\le\infty; \partial U(y_1,a_2)/\partial n_2=g_2(y_1,a_2).$$

The Answer **to Problem (P2C) 4.4 for strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

(P2C) 5. Half-strip $(0\le x_1\le\infty, 0\le x_2\le a_2)$

In this Section formulate eight boundary-value Problem (P2C)s on constructing Green's functions, $G^{(j)}, (j=1-8)$, of Poisson's equation for the half-strip

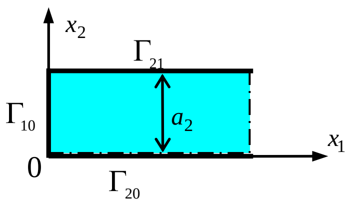

Figure 5: Half-strip with boundary half-straight lines Γ_{20} and Γ_{21} a segment of straight line Γ_{10}.

(P2C)5.1. Boundary-value Problems and integral representation via Green's functions

Let us consider the following boundary value Problem (P2C)s which consist from the Poisson equation

$$\nabla^2 U(x_1, x_2) = -f(x_1, x_2) \tag{5.1}$$

in the inner points of the quadrant. On the boundaries are given three of the following six functions:

$$\begin{aligned} &\partial U(0, y_2)/\partial n_1 = g_1(0, y_2) \ \ or \ \ U(0, y_2) = s_1(0, y_2); \\ &\partial U(y_1, 0)/\partial n_2 = g_2(y_1, 0) \ \ or \ \ U(y_1, 0) = s_2(y_1, 0); \\ &\partial U(y_1, a_2)/\partial n_2 = g_3(y_1, a_2) \ \ or \ \ U(y_1, a_2) = s_3(y_1, a_2). \end{aligned} \tag{5.2}$$

The solutions of these boundary value Problem (P2C)s are expressed via respective Green functions in the form of following integral formula:

$$\begin{aligned} U(x_1, x_2) = &\int_0^\infty \int_0^{a_2} f(\xi_1, \xi_2) G(x_1, \xi_1; x_2, \xi_2) d\xi_1 d\xi_2 + \\ &\int_0^{a_2} \left[\frac{\partial U(0, y_2)}{\partial n_1} G(0, x_1; y_2, x_2) - U(0, y_2) \frac{\partial G(0, x_1; y_2, x_2)}{\partial n_1} \right] dy_2 + \\ &\int_0^\infty \left[\frac{\partial U(y_1, 0)}{\partial n_2} G(y_1, x_1; 0, x_2) - U(y_1, 0) \frac{\partial G(y_1, x_1; 0, x_2)}{\partial n_2} \right] dy_1. + \\ &\int_0^\infty \left[\frac{\partial U(y_1, a_2)}{\partial n_2} G(y_1, x_1; a_2, x_2) - U(y_1, a_2) \frac{\partial G(y_1, x_1; a_2, x_2)}{\partial n_2} \right] dy_1. \end{aligned} \tag{5.3}$$

In eq. (5.3) Green functions G and functions U satisfy Poisson equations

$$\begin{aligned} \nabla^2 G(x_1, \xi_1; x_2, \xi_2) &= -\delta(x - \xi); \\ \nabla^2 U(x_1, x_2) &= -f(x_1, x_2) \end{aligned} \tag{5.4}$$

and the boundary conditions in the following Problems:

Problems (P2C) 5.1- (P2C) 5.8

To construct the Green's functions $G^{(j)}, (j = 1-8)$ for Poisson's equation $\nabla^2 G(x, \xi) = -\delta(x - \xi)$ for the half-strip $(0 \le x_1 \le \infty, 0 \le x_2 \le a_2)$ under the following homogeneous boundary conditions

Problem (P2C) 5.1

$$G^{(1)} = 0, \begin{cases} x_1 = 0; \quad 0 \le x_2 \le a_2;\ U(0, y_2) = s_1(0, y_2); \\ x_2 = 0, a_2; 0 \le x_1 \le \infty;\ U(y_1, 0) = s_2(y_1, 0); \\ x_2 = a_2; 0 \le x_1 \le \infty;\ U(y_1, a_2) = s_3(y_1, a_2). \end{cases}$$

The Answer **to Problem (P2C) 5.1 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 5.2

$$\frac{\partial G^{(2)}}{\partial x_1} = 0; \quad x_1 = 0, \quad 0 \le x_2 \le a_2; \partial U(0, y_2)/\partial n_1 = g_1(0, y_2);$$

$$\frac{\partial G^{(2)}}{\partial x_2} = 0; \quad x_2 = 0,, 0 \le x_1 \le \infty; \partial U(y_1, 0)/\partial n_2 = g_2(y_1, 0);$$

$$\frac{\partial G^{(2)}}{\partial x_2} = 0; \quad x_2 = a_2, 0 \le x_1 \le \infty; \partial U(y_1, a_2)/\partial n_2 = g_3(y_1, a_2).$$

The Answer **to Problem (P2C) 5.2 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 5.3

$$G^{(3)} = 0; \quad x_1 = 0, \quad 0 \le x_2 \le a_2; U(0, y_2) = s_1(0, y_2);$$

$$\frac{\partial G^{(3)}}{\partial x_2} = 0; \quad x_2 = 0, 0 \le x_1 \le \infty; \partial U(y_1, 0)/\partial n_2 = g_2(y_1, 0);.$$

$$\frac{\partial G^{(3)}}{\partial x_2} = 0; \quad x_2 = a_2, 0 \le x_1 \le \infty; \partial U(y_1, a_2)/\partial n_2 = g_3(y_1, a_2).$$

The Answer **to Problem (P2C) 5.3 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 5.4

$$\frac{\partial G^{(4)}}{\partial x_1} = 0; \quad x_1 = 0, \quad 0 \le x_2 \le a_{2;}; \partial U(0, y_2)/\partial n_1 = g_1(0, y_2);$$

$$G^{(4)} = 0; \quad x_2 = 0; 0 \le x_1 \le \infty; \; U(y_1, 0) = s_2(y_1, 0);$$

$$G^{(4)} = 0; \quad x_2 = a_2, 0 \le x_1 \le \infty; \; U(y_1, a_2) = s_3(y_1, a_2).$$

The Answer **to Problem (P2C) 5.4 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 5.5

$$G^{(5)} = 0; \begin{cases} x_1 = 0, \quad 0 \le x_2 \le a_2 \quad U(0, y_2) = s_1(0, y_2); \\ x_2 = 0, \quad 0 \le x_1 \le \infty \quad U(y_1, 0) = s_2(y_1, 0); \end{cases}$$

$$\frac{\partial G^{(5)}}{\partial x_2} = 0; \quad x_2 = a_2, 0 \le x_1 \le \infty; \; \partial U(y_1, a_2)/\partial n_2 = g_3(y_1, a_2).$$

The Answer **to Problem (P2C) 5.5 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 5.6

$$\frac{\partial G^{(6)}}{\partial x_1} = 0; \quad x_1 = 0, \quad 0 \le x_2 \le a_2; \partial U(0, y_2)/\partial n_1 = g_1(0, y_2);$$
$$\frac{\partial G^{(6)}}{\partial x_2} = 0; \quad x_2 = 0, 0 \le x_1 \le \infty; \partial U(y_1, 0)/\partial n_2 = g_2(y_1, 0);.$$
$$G^{(6)} = 0; \quad x_2 = a_2, 0 \le x_1 \le \infty; U(y_1, a_2) = s_3(y_1, a_2).$$

The Answer **to Problem (P2C) 5.6 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 5.7

$$G^{(7)} = 0 \begin{cases} x_1 = 0, \quad 0 \le x_2 \le a_2 \;\; U(0, y_2) = s_1(0, y_2); \\ x_2 = a_2, \;\; 0 \le x_1 \le \infty; \;\; U(y_1, a_2) = s_3(y_1, a_2). \end{cases}$$
$$\frac{\partial G^{(7)}}{\partial x_2} = 0; \quad x_2 = 0, 0 \le x_1 \le \infty; \partial U(y_1, 0)/\partial n_2 = g_2(y_1, 0).$$

The Answer **to Problem (P2C) 5.7 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 5.8

$$\frac{\partial G^{(8)}}{\partial x_1} = 0; \quad x_1 = 0, \quad 0 \le x_2 \le a_2; \partial U(0, y_2)/\partial n_1 = g_1(0, y_2);$$
$$G^{(8)} = 0; \quad x_2 = 0; 0 \le x_1 \le \infty; U(y_1, 0) = s_2(y_1, 0);$$
$$\frac{\partial G^{(8)}}{\partial x_2} = 0; \quad x_2 = a_2; 0 \le x_1 \le \infty; \partial U(y_1, a_2)/\partial n_2 = g_3(y_1, a_2).$$

The Answer **to Problem (P2C) 5.8 for half-strip** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

(P2C) 6. Rectangle $(0 \le x_1 \le a_1, 0 \le x_2 \le a_2)$

In this section formulates 16 boundary-value Problem (P2C)s on constructing Green's functions, $G^{(j)}, (j = 1 - 16)$, of Poisson's equation for t

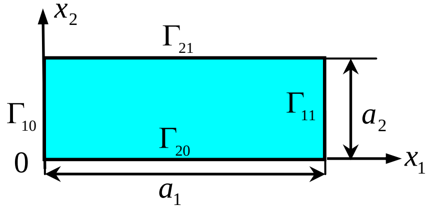

Figure 6: Rectangle with boundary segments of straight lines Γ_{10}, Γ_{11} and Γ_{20}, Γ_{21}.

(P2C) 6.1. Boundary-value Problems and integral representation via Green's functions

Let us consider the following boundary value Problem (P2C)s which consist from the Poisson equation

$$\nabla^2 U(x_1, x_2) = -f(x_1, x_2) \tag{6.1}$$

in the inner points of the quadrant. On the boundaries are given four of the following eight functions:

$$\begin{gathered}\partial U(0,y_2)/\partial n_1 = g_1(0,y_2) \ \ or \ \ U(0,y_2) = s_1(0,y_2);\\ \partial U(a_1,y_2)/\partial n_1 = g_4(a_1,y_2) \ \ or \ \ U(a_1,y_2) = s_4(a_1,y_2);\\ \partial U(y_1,0)/\partial n_2 = g_2(y_1,0) \ \ or \ \ U(y_1,0) = s_2(y_1,0);\\ \partial U(y_1,a_2)/\partial n_2 = g_3(y_1,a_2) \ \ or \ \ U(y_1,a_2) = s_3(y_1,a_2).\end{gathered} \tag{6.2}$$

The solutions of these boundary value Problem (P2C)s are expressed via respective Green functions in the form of following integral formula:

$$\begin{gathered}U(x_1,x_2) = \int_0^{a_1}\int_0^{a_2} f(\xi_1,\xi_2)G(x_1,\xi_1;x_2,\xi_2)d\xi_1 d\xi_2 + \\ \int_0^{a_2}\left[\frac{\partial U(0,y_2)}{\partial n_1}G(0,x_1;y_2,x_2) - U(0,y_2)\frac{\partial G(0,x_1;y_2,x_2)}{\partial n_1}\right]dy_2 + \\ \int_0^{a_2}\left[\frac{\partial U(a_1,y_2)}{\partial n_1}G(a_1,x_1;y_2,x_2) - U(a_1,y_2)\frac{\partial G(a_1,x_1;y_2,x_2)}{\partial n_1}\right]dy_2 + \\ \int_0^{a_1}\left[\frac{\partial U(y_1,0)}{\partial n_2}G(y_1,x_1;0,x_2) - U(y_1,0)\frac{\partial G(y_1,x_1;0,x_2)}{\partial n_2}\right]dy_1 + \\ \int_0^{a_1}\left[\frac{\partial U(y_1,a_2)}{\partial n_2}G(y_1,x_1;a_2,x_2) - U(y_1,a_2)\frac{\partial G(y_1,x_1;a_2,x_2)}{\partial n_2}\right]dy_1.\end{gathered} \tag{6.3}$$

In eq. (6.3) Green functions G and functions U satisfy Poisson equations

$$\begin{gathered}\nabla^2 G(x_1,\xi_1;x_2,\xi_2) = -\delta(x-\xi);\\ \nabla^2 U(x_1,x_2) = -f(x_1,x_2)\end{gathered} \tag{6.4}$$

and the following boundary conditions:

Problems (P2C)6.1- (P2C)6.16

To construct the Green's functions $G^{(j)}$, $(j=1-16)$ for Poisson's equation $\nabla^2 G(x,\xi) = -\delta(x-\xi)$ for the rectangle $(0 \le x_1 \le a_1, 0 \le x_2 \le a_2)$ under the following homogeneous boundary conditions

Problem (P2C) 6.1

$$\boxed{\begin{array}{c} G^{(1)}=0; x_1=0;\ 0\le x_2\le a_2; U(0,y_2)=s_1(0,y_2); \\ G^{(1)}=0; x_1=a_1\ 0\le x_2\le a_2; U(a_1,y_2)=s_4(a_1,y_2); \\ G^{(1)}=0;\ x_2=0,\ 0\le x_1\le a_1; U(y_1,0)=s_2(y_1,0); \\ G^{(1)}=0;\ x_2=a_2;\ 0\le x_1\le a_1; U(y_1,a_2)=s_3(y_1,a_2). \end{array}}$$

The Answer **to Problem (P2C) 6.1 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.2

$$\boxed{\begin{array}{c} \dfrac{\partial G^{(2)}}{\partial x_1}=0; x_1=0,\ 0\le x_2\le a_2; \dfrac{\partial U(0,y_2)}{\partial n_1}=g_1(0,y_2); \\ \dfrac{\partial G^{(2)}}{\partial x_1}=0; x_1=a_1;\ 0\le x_2\le a_2; \dfrac{\partial U(a_1,y_2)}{\partial n_1}=g_4(a_1,y_2); \\ \dfrac{\partial G^{(2)}}{\partial x_2}=0; x_2=0;\ \ 0\le x_1\le a_1; \dfrac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0); \\ \dfrac{\partial G^{(2)}}{\partial x_2}=0; x_2=a_2;\ 0\le x_1\le a_1 .; \dfrac{\partial U(y_1,a_2)}{\partial n_2}=g_3(y_1,a_2). \end{array}}$$

The Answer **to Problem (P2C) 6.2 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.3

$$G^{(3)}=0;\ x_1=0;\ 0\le x_2\le a_2; U(0,y_2)=s_1(0,y_2);$$
$$G^{(3)}=0;\ x_1=a_1;\ 0\le x_2\le a_2; U(a_1,y_2)=s_4(a_1,y_2);$$
$$\frac{\partial G^{(3)}}{\partial x_2}=0;\ x_2=0;\ 0\le x_1\le a_1; \frac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0);$$
$$\frac{\partial G^{(3)}}{\partial x_2}=0;\ x_2=a_2;\ 0\le x_1\le a_1; \frac{\partial U(y_1,a_2)}{\partial n_2}=g_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.3 for rectangule** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.4

$$\frac{\partial G^{(4)}}{\partial x_1}=0;\ x_1=0;\ 0\le x_2\le a_2; \frac{\partial U(0,y_2)}{\partial n_1}=g_1(0,y_2);$$
$$\frac{\partial G^{(4)}}{\partial x_1}=0;\ x_1=a_1;\ 0\le x_2\le a_2; \frac{\partial U(a_1,y_2)}{\partial n_1}=g_4(a_1,y_2);$$
$$G^{(4)}=0;\ x_2=0;\ 0\le x_1\le a_1;\ U(y_1,0)=s_2(y_1,0);$$
$$G^{(4)}=0;\ x_2=a_2;\ 0\le x_1\le a_1; U(y_1,a_2)=s_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.4 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.5

$$G^{(5)}=0; x_1=0;\ 0\le x_2\le a_2; U(0,y_2)=s_1(0,y_2);$$
$$\frac{\partial G^{(5)}}{\partial x_1}=0; x_1=a_1; 0\le x_2\le a_2; \frac{\partial U(a_1,y_2)}{\partial n_1}=g_4(a_1,y_2);$$
$$G^{(5)}=0; x_2=0, 0\le x_1\le a_1; U(y_1,0)=s_2(y_1,0);$$
$$G^{(5)}=0; x_2=a_2, 0\le x_1\le a_1; U(y_1,a_2)=s_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.5 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.6

$$\frac{\partial G^{(6)}}{\partial x_1}=0;\ x_1=0; 0\le x_2\le a_2; \frac{\partial U(0,y_2)}{\partial n_1}=g_1(0,y_2);$$
$$G^{(6)}=0;\ x_1=a_1;\ 0\le x_2\le a_2; U(a_1,y_2)=s_4(a_1,y_2);$$
$$\frac{\partial G^{(6)}}{\partial x_2}=0;\ x_2=0; 0\le x_1\le a_1; \frac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0);$$
$$\frac{\partial G^{(6)}}{\partial x_2}=0;\ x_2=a_2; 0\le x_1\le a_1;. \frac{\partial U(y_1,a_2)}{\partial n_2}=g_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.6 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.7

$$G^{(7)}=0;\ x_1=0;\ 0\le x_2\le a_2;\ U(0,y_2)=s_1(0,y_2);$$
$$\frac{\partial G^{(7)}}{\partial x_1}=0;\ x_1=a_1;\ 0\le x_2\le a_2;\ \frac{\partial U(a_1,y_2)}{\partial n_1}=g_4(a_1,y_2);$$
$$\frac{\partial G^{(7)}}{\partial x_2}=0;\ x_2=0;\ 0\le x_1\le a_1;\ \frac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0);$$
$$\frac{\partial G^{(7)}}{\partial x_2}=0;\ x_2=a_2;\ 0\le x_1\le a_1;\ \frac{\partial U(y_1,a_2)}{\partial n_2}=g_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.7 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.8

$$\frac{\partial G^{(8)}}{\partial x_1}=0;\ x_1=0;\ 0\le x_2\le a_2;\ \frac{\partial U(0,y_2)}{\partial n_1}=g_1(0,y_2);$$
$$G^{(8)}=0;\ x_1=a_1,0\le x_2\le a_2;\ U(a_1,y_2)=s_4(a_1,y_2);$$
$$G^{(8)}=0;\ x_2=0;\ 0\le x_1\le a_1;\ U(y_1,0)=s_2(y_1,0);$$
$$G^{(8)}=0;\ x_2=a_2;\ 0\le x_1\le a_1;\ U(y_1,a_2)=s_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.8 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.9

$$
\begin{array}{c}
G^{(9)}=0; x_1=0,\ 0\le x_2\le a_2; U(0,y_2)=s_1(0,y_2);\\
G^{(9)}=0; x_1=a_1,\ 0\le x_2\le a_2; U(a_1,y_2)=s_4(a_1,y_2);\\
\dfrac{\partial G^{(9)}}{\partial x_2}=0; x_2=0;\ 0\le x_1\le a_1; \dfrac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0);\\
G^{(9)}=0;\ x_2=a_2; 0\le x_1\le a_1; U(y_1,a_2)=s_3(y_1,a_2).
\end{array}
$$

The Answer **to Problem (P2C) 6.9 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.10

$$
\begin{array}{c}
G^{(10)}=0; x_1=0,\ 0\le x_2\le a_2; U(0,y_2)=s_1(0,y_2);\\
G^{(10)}=0; x_1=a_1,\ 0\le x_2\le a_2; U(a_1,y_2)=s_4(a_1,y_2);\\
G^{(10)}=0; x_2=0;\ 0\le x_1\le a_1; U(y_1,0)=s_2(y_1,0);\\
\dfrac{\partial G^{(10)}}{\partial x_2}=0; x_2=a_2;\ 0\le x_1\le a_1; \dfrac{\partial U(y_1,a_2)}{\partial n_2}=g_3(y_1,a_2).
\end{array}
$$

The Answer **to Problem (P2C) 6.10 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.11

$$\frac{\partial G^{(11)}}{\partial x_1} = 0;\ x_1 = 0;\ 0 \le x_2 \le a_2;\ \frac{\partial U(0, y_2)}{\partial n_1} = g_1(0, y_2);$$
$$.\frac{\partial G^{(11)}}{\partial x_1} = 0;\ x_1 = a_1;\ 0 \le x_2 \le a_2;\ \frac{\partial U(a_1, y_2)}{\partial n_1} = g_4(a_1, y_2);$$
$$G^{(11)} = 0; x_2 = 0;\ 0 \le x_1 \le a_1;\ U(y_1, 0) = s_2(y_1, 0);$$
$$\frac{\partial G^{(11)}}{\partial x_2} = 0; x_2 = a_2;\ 0 \le x_1 \le a_1;\ \frac{\partial U(y_1, a_2)}{\partial n_2} = g_3(y_1, a_2).$$

The Answer **to Problem (P2C) 6.11 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.12

$$G^{(12)} = 0; x_1 = 0;\ 0 \le x_2 \le a_2;\ U(0, y_2) = s_1(0, y_2);$$
$$.\frac{\partial G^{(12)}}{\partial x_1} = 0;\ x_1 = a_1;\ 0 \le x_2 \le a_2;\ \frac{\partial U(a_1, y_2)}{\partial n_1} = g_4(a_1, y_2);$$
$$G^{(12)} = 0; x_2 = 0;\ 0 \le x_1 \le a_1;\ U(y_1, 0) = s_2(y_1, 0);$$
$$\frac{\partial G^{(12)}}{\partial x_2} = 0; x_2 = a_2;\ 0 \le x_1 \le a_1;\ \frac{\partial U(y_1, a_2)}{\partial n_2} = g_3(y_1, a_2).$$

The Answer **to Problem (P2C) 6.12 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.13

$$\frac{\partial G^{(13)}}{\partial x_1}=0; x_1=0; 0\le x_2\le a_2; \frac{\partial U(0,y_2)}{\partial n_1}=g_1(0,y_2);$$
$$G^{(13)}=0; x_1=a_1; 0\le x_2\le a_2; U(a_1,y_2)=s_4(a_1,y_2);$$
$$G^{(13)}=0;\ x_2=0;\ 0\le x_1\le a_1; U(y_1,0)=s_2(y_1,0);$$
$$\frac{\partial G^{(13)}}{\partial x_2}=0;\ x_2=a_2; 0\le x_1\le a_1; \frac{\partial U(y_1,a_2)}{\partial n_2}=g_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.13 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.14

$$\frac{\partial G^{(14)}}{\partial x_1}=0; x_1=0, a_1;\ 0\le x_2\le a_2; \frac{\partial U(0,y_2)}{\partial n_1}=g_1(0,y_2);$$
$$\frac{\partial G^{(14)}}{\partial x_1}=0; x_1=0, a_1;\ 0\le x_2\le a_2; \frac{\partial U(a_1,y_2)}{\partial n_1}=g_4(a_1,y_2);$$
$$\frac{\partial G^{(14)}}{\partial x_2}=0; x_2=0;\ 0\le x_1\le a_1; \frac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0);$$
$$G^{(14)}=0; x_2=a_2; 0\le x_1\le a_1;.U(y_1,a_2)=s_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.14 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.15

$$G^{(15)}=0;\ x_1=0;0\le x_2\le a_2;U(0,y_2)=s_1(0,y_2);$$
$$\frac{\partial G^{(15)}}{\partial x_1}=0;\ x_1=a_1;0\le x_2\le a_2;\ \frac{\partial U(a_1,y_2)}{\partial n_1}=g_4(a_1,y_2);$$
$$\frac{\partial G^{(15)}}{\partial x_2}=0;x_2=0;0\le x_1\le a_1;\frac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0);$$
$$G^{(15)}=0;\ x_2=a_2;0\le x_1\le a_1;U(y_1,a_2)=s_3(y_1,a_2)$$

The Answer **to Problem (P2C) 6.15 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)

Problem (P2C) 6.16

$$\frac{\partial G^{(16)}}{\partial x_1}=0;\ x_1=0;0\le x_2\le a_2;\ \frac{\partial U(0,y_2)}{\partial n_1}=g_1(0,y_2);$$
$$G^{(16)}=0;\ x_1=a_1;0\le x_2\le a_2;U(a_1,y_2)=s_4(a_1,y_2);$$
$$\frac{\partial G^{(16)}}{\partial x_2}=0;\ x_2=0;\ 0\le x_1\le a_1;\frac{\partial U(y_1,0)}{\partial n_2}=g_2(y_1,0);$$
$$G^{(16)}=0;\ x_2=a_2;\ 0\le x_1\le a_1;U(y_1,a_2)=s_3(y_1,a_2).$$

The Answer **to Problem (P2C) 6.16 for rectangle** (Green's function for Poisson's equation) can be found in the following books:

1. Victor Seremet & Guy Bonnet, Encyclopedia of Domain Green's Functions (Thermo-magneto-electrostatics of solids in rectangular and polar coordinates), State Agrarian University of Moldova: Publisher Center of UASM, Chisinau, Moldova, 2008, 220 pag., (in English).
2. Seremet V.D. Handbook of Green's functions and matrices - WIT press, Southampton and Boston, UK&USA, 2003, Book 304 p. + CD ROM, 232 p. (in English)