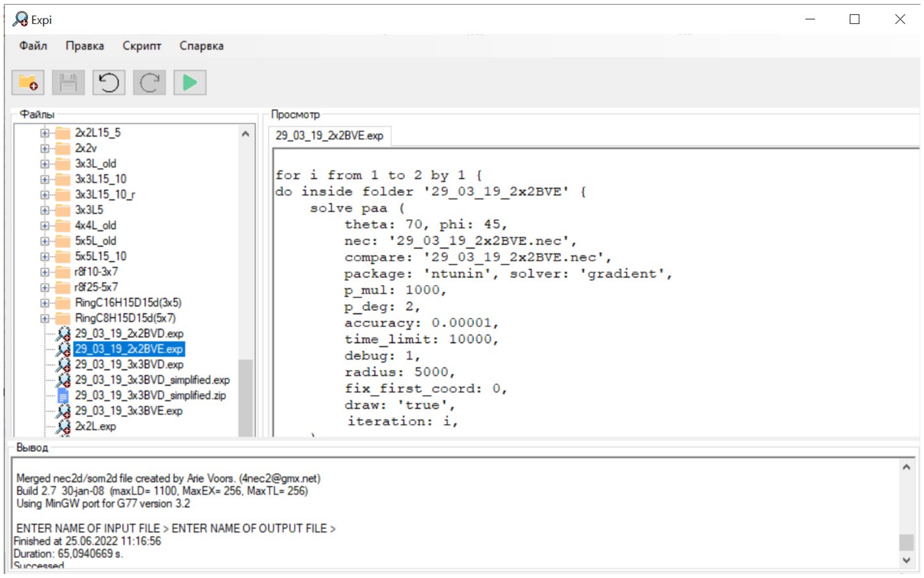
1 Графический интерфейс

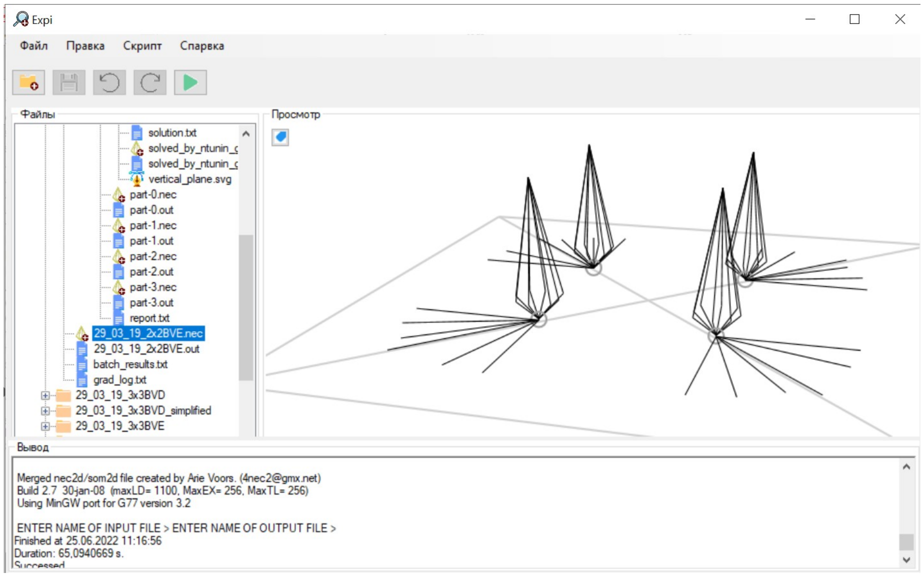


```
for i from 1 to 2 by 1 {
do inside folder '29_03_19_2x2BVE' {
    solve paa (
        theta: 70, phi: 45,
        nec: '29_03_19_2x2BVE.nec',
        compare: '29_03_19_2x2BVE.nec',
        package: 'ntunin', solver: 'gradient',
        p_mul: 1000,
        p_deg: 2,
        accuracy: 0.00001,
        time_limit: 10000,
        debug: 1,
        radius: 5000,
        fix_first_coord: 0,
        draw: 'true',
         iteration: i,
```

```
Merged nec2d/som2d file created by Arie Voors. (4nec2@gmx.net)
Build 2.7  30-jan-08  (maxLD= 1100, MaxEX= 256, MaxTL= 256)
Using MinGW port for G77 version 3.2

ENTER NAME OF INPUT FILE > ENTER NAME OF OUTPUT FILE >
Finished at 25.06.2022 11:16:56
Duration: 65,0940669 s.
Successed
```

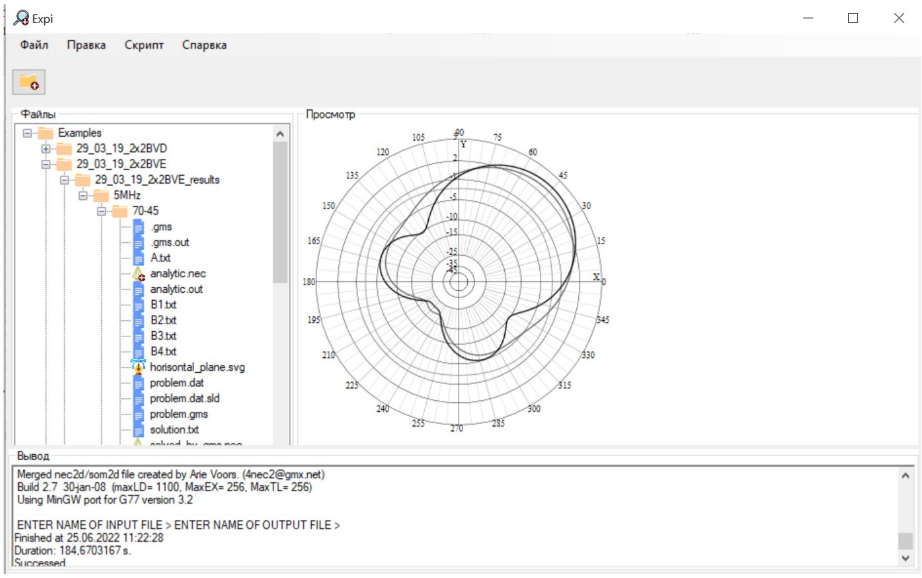
Рис. 1: Редактор исполняемых файлов



```
Merged nec2d/som2d file created by Arie Voors. (4nec2@gmx.net)
Build 2.7  30-jan-08  (maxLD= 1100, MaxEX= 256, MaxTL= 256)
Using MinGW port for G77 version 3.2

ENTER NAME OF INPUT FILE > ENTER NAME OF OUTPUT FILE >
Finished at 25.06.2022 11:16:56
Duration: 65,0940669 s.
Successed
```

Рис. 2: Предпросмотр геометрии



```
Merged nec2d/som2d file created by Arie Voors. (4nec2@gmx.net)
Build 2.7  30-jan-08  (maxLD= 1100, MaxEX= 256, MaxTL= 256)
Using MinGW port for G77 version 3.2

ENTER NAME OF INPUT FILE > ENTER NAME OF OUTPUT FILE >
Finished at 25.06.2022 11:22:28
Duration: 184,6703167 s.
Successed
```

Рис. 3: Предпросмотр результатов

2 Языковые конструкции

Листинг 1: Переменные

```
def x = 1
def point = (0, 0, 1)
```

Листинг 2: Сегментированный провод

```
(0, 0, 0) -> (1, 0, 1) -> (0, 0, 5)
(0, 0, 0) -> (1, 0, 1) ~1v~ (0, 0, 5)
(0, 0, 0) -> (1, 0, 1) ~1+0.5iA~ (0, 0, 5)
```

Листинг 3: Линейные преобразования

```
translate x to 0.5
translate to (0, 0, 1)
rotate around z by pi/2
```

Листинг 4: Циклы

```

for angle from 0 to 2 * pi by pi/8 {
   rotate around z by angle
   (0, 0, 0) -> (1, 0, 0)
}

for angle from 0 up to 2 * pi by pi/8 {
   rotate around z by angle
   (0, 0, 0) -> (1, 0, 0)
}
```

Листинг 5: Группы команд

```
def Emitter {
    for angle from 0 to 2 * pi by pi/8 {
       rotate around z by angle
       (0, 0, 0) -> (1, 0, 0)
    }
}

translate x to -5
Emitter
translate x to 5
Emitter
```

Листинг 6: Оптимизация направленности ФАР

```
solve paa (
    n: ’bve_2x2.nec’,
    theta: 70,
    phi: 45,
    p: ’ntunin’,
    s: ’grad’,
    c: ’bve.nec’,
    p_mul: 1000000,
    p_deg: 4,
    time_limit: 1000,
    accuracy: 0.000001
)
```

Листинг 7: Полный текст примера вычислительного эксперимента

```

def knees = 8
def height = 15
def kneeWidth = 2.5
def base = 0.5
def rize = 2
def radialsCount = 6
def radialLength = 15
def size = 2
def distance = 20

def Drop {
   def step = 2 * pi / knees
   for angle from 0 to 2 * pi by step {
      rotate around z by angle
      (0, 0, 0) -> (kneeWidth, 0, kneeWidth) -> (0, 0, height)
   }
}

def BVE {
   (0, 0, 0) ~1v~ (0, 0, base)
   def step = pi / 2 / (radialsCount - 1)
   for i from 0 to  radialsCount  by 1 {
       rotate around z by i * step
       (0, 0, 0) -> (radialLength, 0, 0)
   }
   translate z to base
   Drop
}

def PlaceBVE {
   translate to (x, y, 0)
   rotate around z by angle
   BVE
}

def PAA {
   def width = (size - 1) * distance
   def left = -width/2
   def right = width/2
   def top = width/2
   def bottom = -width/2

   PlaceBVE(x: left, y: top, angle: pi / 2)
   PlaceBVE(x: right, y: top, angle: 0)
   PlaceBVE(x: right, y: bottom, angle: -pi / 2)
   PlaceBVE(x: left, y: bottom, angle: pi)
}

def ExportPAA {
    export nec (n: ’bve_${size}x${size}.nec’, f: 5, g: ’real’) {
        translate z to rize
        PAA
    }
}

def One {
    (0, 0, 0) ~1v~ (0, 0, base)
    def oneRadialsCount = (radialsCount - 1) * 4
    def step = 2 * pi / (oneRadialsCount - 1)
    for i from 0 to  oneRadialsCount by 1 {
        rotate around z by i * step
        (0, 0, 0) -> (radialLength, 0, 0)
    }
    translate z to base
    Drop
}

def ExportOne {
    export nec (n: ’bve.nec’, f: 5, g: ’real’) {
        translate z to rize
        One
    }
}

do inside folder ’05.04.22’ {
    ExportOne
    ExportPAA

    solve paa (
        n: ’bve_${size}x${size}.nec’,
        theta: 70,
        phi: 45,
        p: ’ntunin’,
        s: ’grad’,
        c: ’bve.nec’,
        p_mul: 1000000,
        p_deg: 4,
        time_limit: 1000,
        accuracy: 0.000001
    )
    solve paa (
        n: ’old_bve_${size}x${size}.nec’,
        theta: 70,
        phi: 45,
        p: ’ntunin’,
        s: ’grad’,
        c: ’bve.nec’,
        p_mul: 1000000,
        p_deg: 4,
        time_limit: 1000,
        accuracy: 0.000001
    )
}
```