In [27]:
```
using Plots, SymPy
```

ヒント for 問 1 (5)

In [2]:
```
f(x,y) = x * sqrt(abs(y)) / sqrt( x^2 + y^2 )
```

Out[2]:
```
f (generic function with 1 method)
```

In [17]:
```
X = -0.1:0.01001:0.1
Y = X
```

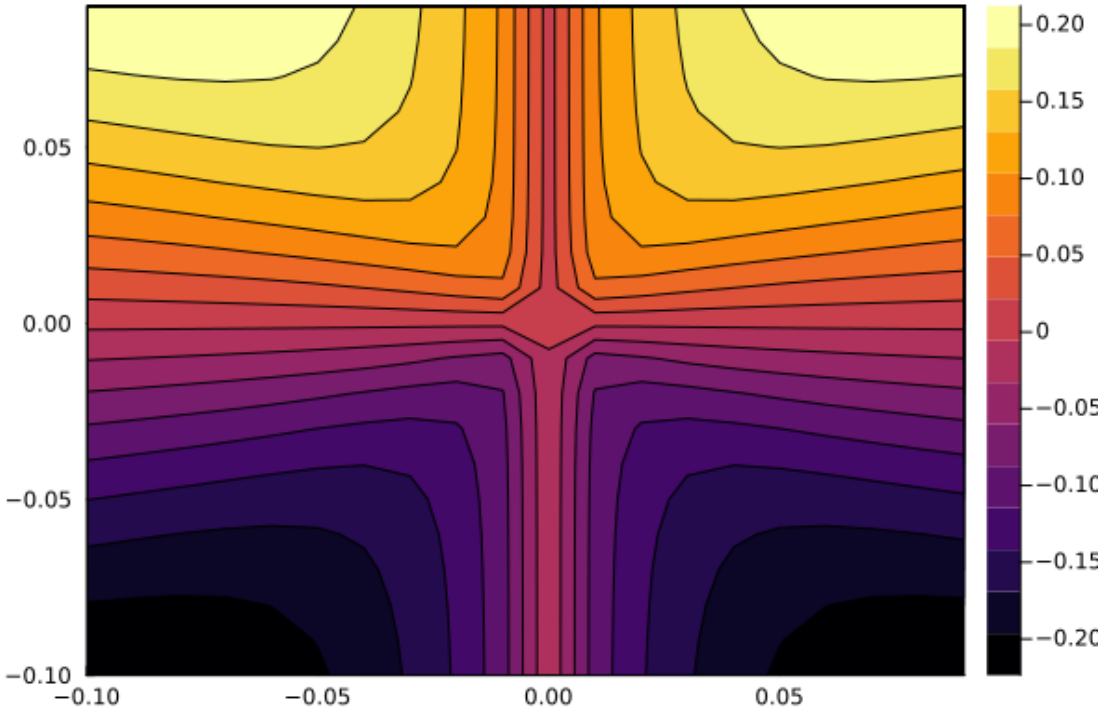
Out[17]:
```
-0.1:0.01001:0.09019
```

In [20]:
```
z = [ f(x,y) for x in X, y in Y ]
```

Out[20]:
```
20×20 Matrix{Float64}:
 -0.223607     -0.222987     -0.220857     …  -0.220917     -0.223013
 -0.211532     -0.21212      -0.211386        -0.211416     -0.21212
 -0.197516     -0.199283     -0.199975        -0.199975     -0.199256
 -0.181293     -0.184136     -0.186211        -0.18618      -0.184085
 -0.162618     -0.166337     -0.169639        -0.16958      -0.166266
 -0.141308     -0.145586     -0.149807     …  -0.149724     -0.1455
 -0.117292     -0.121693     -0.126349        -0.126254     -0.121603
 -0.0906728    -0.0946732    -0.0991188       -0.0990254    -0.0945891
 -0.0617788    -0.0648343    -0.0683486       -0.0682733    -0.064769
 -0.0311854    -0.0328367    -0.0347756       -0.0347335    -0.0328011
  0.000316228   0.000333352   0.000353597  …   0.000353156   0.000332982
  0.0318085     0.0334912     0.0354665        0.0354236     0.0334549
  0.062375      0.0654544     0.0689942        0.0689183     0.0653887
  0.0912284     0.0952423     0.0996991        0.0996055     0.0951579
  0.117798      0.122202      0.126854         0.12676       0.122111
  0.14176       0.146031      0.150238     …   0.150156      0.145945
  0.163017      0.16672       0.170001         0.169942      0.16665
  0.18164       0.184463      0.186512         0.186481      0.184413
  0.197817      0.199561      0.200225         0.200225      0.199535
  0.211792      0.212356      0.211593         0.211624      0.212356
```

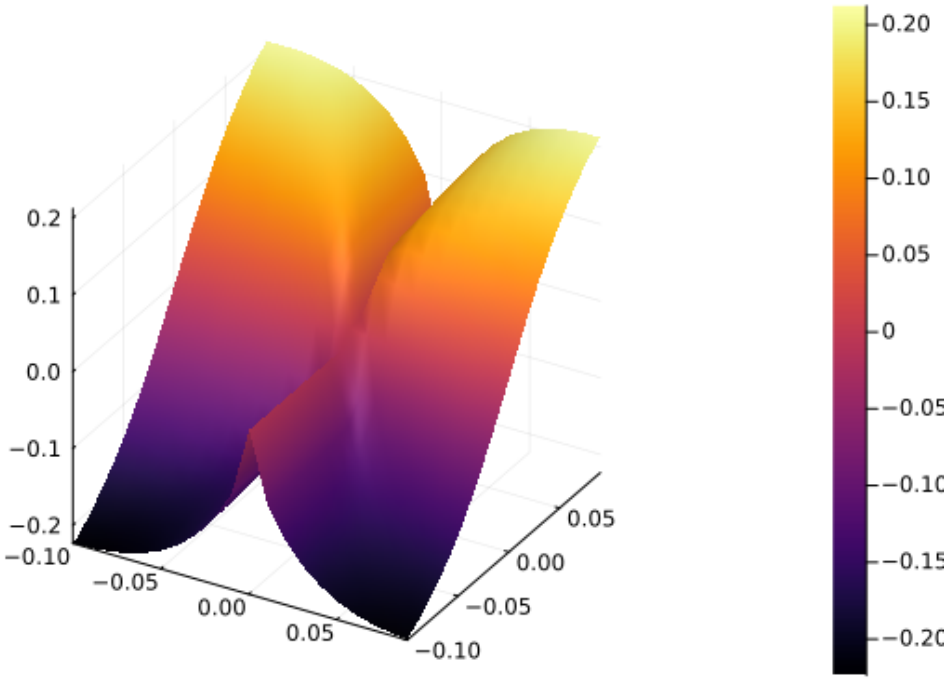
In [24]:
```
contour(X, Y, z, fill = true )
```

Out[24]:



In [26]:
```
surface(X, Y, z)
```

Out[26]:



グラフを見ると、$(x, y) = (0, 0)$ で関数は連続なように見える.

ヒント for 問 4 (1)

In [28]:
```
@syms x y
```

Out[28]:
```
(x, y)
```

In [29]:
```
eq1 = x^2 * y^5 - 2 * x^3 * y^2 + y
```

Out[29]: $-2x^3y^2 + x^2y^5 + y$

In [30]:
```
diff( eq1, x )
```

Out[30]: $-6x^2y^2 + 2xy^5$

In [31]:
```
diff( eq1, y )
```

Out[31]: $-4x^3y + 5x^2y^4 + 1$

ヒント for 問 4 (6)

In [32]:
```
eq2 = log( x^2 + x*y + y^2 )
```

Out[32]: $\log\left(x^2 + xy + y^2\right)$

In [33]:
```
diff( eq2, x )
```

Out[33]: $\frac{2x+y}{x^2+xy+y^2}$

In [34]:
```
diff( eq2, y )
```

Out[34]: $\frac{x+2y}{x^2+xy+y^2}$

ヒント for 問 4 (8)

In [36]:
```
eq3 = atan( y/x )
```

Out[36]: $\operatorname{atan}\left(\frac{y}{x}\right)$

In [37]:
```
diff( eq3, x )
```

Out[37]: $-\frac{y}{x^2\left(1+\frac{y^2}{x^2}\right)}$

In [38]:
```
diff( eq3, y )
```

Out[38]: $\frac{1}{x\left(1+\frac{y^2}{x^2}\right)}$

In [ ]: