Hupp2

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1.b

Koden bifogas i avsnitt 2.b.

1.c

Koden bifogas i avsnitt 2.c.

Fall i)
$E_{ut} = (i, 0), I_{ut} = 1$

Fall ii)
$E_{ut} = 10^{-15}(-0.2 + 0.05i, 0), I_{ut} = 5 \cdot 10^{-32}$

Fall iii
$E_{ut} = 10^{-15}(-0.2 + 0.05i, 0), I_{ut} = 5 \cdot 10^{-32}$

Fall iv)
$E_{ut} = (i, 0), I_{ut} = 1$

1.d

Koden bifogas i avsnitt 2.d.

Intensiteten på spökbilden blir ungefär 0.15, alltså 15% av det ingående fältets intensitet.

1.e

Koden bifogas i avsnitt 2.e.

Om man vrider glasen vid papperslapparna 90° så blir den oönskade bildens intensitet ca. $7 \cdot 10^{-32}$ (den försvinner). Priset man får betala är att den önskade bildens intensitet minskar till ca. 0.85 av det utgående fältets densitet.

2 MATLAB

2.b

J_pol.m

```
function matris = J_pol( alfa )
    polarisationsmatris=[1 0; 0 0];
    matris = J_proj(-alfa) * polarisationsmatris * J_proj(alfa);
end
```

J_ret.m

```
function matris = J_ret(alfa, phi)
    retarderingsmatris = [exp(j*phi) 0; 0 1];
    matris = J_proj(-alfa)*retarderingsmatris*J_proj(alfa);
end
```

2.c Hupp2c.m

Koden finns på nästa sida.

Contents


```
clear all; clc;
E_in = [1;0];
```

R -> R

```
J_ret0 = J_ret(pi/4, pi/2);
J_ret1 = J_ret(-pi/4, pi/2);
J_pol1 = J_pol(0);
E_ut1 = J_pol1*J_ret1*J_ret0*E_in
I_1 = (abs(E_ut1(1)))^2 + (abs(E_ut1(2)))^2
```

```
E_ut1 =

  -0.0000 + 1.0000i
   0.0000 + 0.0000i


I_1 =

     1
```

R -> L

```
J_ret0 = J_ret(pi/4, pi/2);
J_ret1 = J_ret(pi/4, pi/2);
J_pol1 = J_pol(0);
E_ut2 = J_pol1*J_ret1*J_ret0*E_in
I_2 = (abs(E_ut2(1)))^2 + (abs(E_ut2(2)))^2
```

```
E_ut2 =

   1.0e-15 *

  -0.2220 + 0.0555i
   0.0000 + 0.0000i


I_2 =

   5.2385e-32
```

L -> R

```
J_ret0 = J_ret(-pi/4, pi/2);
J_ret1 = J_ret(-pi/4, pi/2);
J_pol1 = J_pol(0);
E_ut3 = J_pol1*J_ret1*J_ret0*E_in
I_3 = (abs(E_ut3(1)))^2 + (abs(E_ut3(2)))^2
```

```
E_ut3 =

   1.0e-15 *

  -0.2220 + 0.0555i
   0.0000 + 0.0000i


I_3 =

   5.2385e-32
```

L -> L

```
J_ret0 = J_ret(-pi/4, pi/2);
J_ret1 = J_ret(pi/4, pi/2);
J_pol1 = J_pol(0);
E_ut4 = J_pol1*J_ret1*J_ret0*E_in
I_4 = (abs(E_ut4(1)))^2 + (abs(E_ut4(2)))^2
```

```
E_ut4 =

  -0.0000 + 1.0000i
   0.0000 + 0.0000i


I_4 =

     1
```

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2.d Hupp2d.m

Koden finns på nästa sida.

Contents


```
clear all; clc;
E_in = [1;0];
```

R -> R

```
J_ret0 = J_ret(pi/4, 1.25*pi/2);
J_ret1 = J_ret(-pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut1 = J_pol1*J_ret1*J_ret0*E_in
I_1 = (abs(E_ut1(1)))^2 + (abs(E_ut1(2)))^2
```

```
E_ut1 =

  -0.3827 + 0.9239i
   0.0000 + 0.0000i


I_1 =

    1.0000
```

R -> L

```
J_ret0 = J_ret(pi/4, 1.25*pi/2);
J_ret1 = J_ret(pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut2 = J_pol1*J_ret1*J_ret0*E_in
I_2 = (abs(E_ut2(1)))^2 + (abs(E_ut2(2)))^2
```

```
E_ut2 =

   0.1464 - 0.3536i
   0.0000 + 0.0000i


I_2 =

    0.1464
```

L -> R

```
J_ret0 = J_ret(-pi/4, 1.25*pi/2);
J_ret1 = J_ret(-pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut3 = J_pol1*J_ret1*J_ret0*E_in
I_3 = (abs(E_ut3(1)))^2 + (abs(E_ut3(2)))^2
```

```
E_ut3 =

   0.1464 - 0.3536i
   0.0000 + 0.0000i


I_3 =

    0.1464
```

L -> L

```
J_ret0 = J_ret(-pi/4, 1.25*pi/2);
J_ret1 = J_ret(pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut4 = J_pol1*J_ret1*J_ret0*E_in
I_4 = (abs(E_ut4(1)))^2 + (abs(E_ut4(2)))^2
```

```
E_ut4 =

  -0.3827 + 0.9239i
   0.0000 + 0.0000i


I_4 =

    1.0000
```

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2.e Hupp2e.m

Koden finns på nästa sida.

Contents


```
clear all; clc;
E_in = [0;1];
```

R -> R

```
J_ret0 = J_ret(pi/4, 1.25*pi/2);
J_ret1 = J_ret(-pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut1 = J_pol1*J_ret1*J_ret0*E_in
I_1 = (abs(E_ut1(1)))^2 + (abs(E_ut1(2)))^2
```

```
E_ut1 =

   1.0e-15 *

   0.1388 - 0.2220i
   0.0000 + 0.0000i


I_1 =

   6.8563e-32
```

R -> L

```
J_ret0 = J_ret(pi/4, 1.25*pi/2);
J_ret1 = J_ret(pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut2 = J_pol1*J_ret1*J_ret0*E_in
I_2 = (abs(E_ut2(1)))^2 + (abs(E_ut2(2)))^2
```

```
E_ut2 =

  -0.8536 - 0.3536i
   0.0000 + 0.0000i


I_2 =

    0.8536
```

L -> R

```
J_ret0 = J_ret(-pi/4, 1.25*pi/2);
J_ret1 = J_ret(-pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut3 = J_pol1*J_ret1*J_ret0*E_in
I_3 = (abs(E_ut3(1)))^2 + (abs(E_ut3(2)))^2
```

```
E_ut3 =

   0.8536 + 0.3536i
   0.0000 + 0.0000i


I_3 =

    0.8536
```

L -> L

```
J_ret0 = J_ret(-pi/4, 1.25*pi/2);
J_ret1 = J_ret(pi/4, 1.25*pi/2);
J_pol1 = J_pol(0);
E_ut4 = J_pol1*J_ret1*J_ret0*E_in
I_4 = (abs(E_ut4(1)))^2 + (abs(E_ut4(2)))^2
```

```
E_ut4 =

   1.0e-15 *

  -0.1388 + 0.2220i
   0.0000 + 0.0000i


I_4 =

   6.8563e-32
```

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