Calculation of the interference term

https://github.com/gramolin/esepp/

The FeynCalc package:

```
In[1]:= << HighEnergyPhysics`FeynCalc`
```

The squares of the four-momenta:

```
In[2]:= ScalarProduct[l, l] = m^2;
        ScalarProduct[p, p] = M^2;
        ScalarProduct[l', l'] = m^2;
        ScalarProduct[p', p'] = M^2;
        ScalarProduct[k, k] = 0;
```

The lepton tensor:

```
In[7]:= L1 = 1/2 Tr[(GS[l'] + m).GA[α].(GS[l' + k] + m).GA[μ].(GS[l] + m).GA[ν]];

In[8]:= L2 = L1 /. {l → -l', l' → -l};
```

The proton tensor:

```
In[9]:= P1 = 1/2 Tr[(GS[p'] + M).((F11 + F21) GA[μ] - F21/(2 M) FourVector[p + p', μ]).
              (GS[p] + M).((F12 + F22) GA[ν] - F22/(2 M) (FourVector[p + p' + k, ν] - GA[ν].(GS[p' + k] - M))).
              (GS[p' + k] + M)/(2 ScalarProduct[k, p']).((F10 + F20) GA[α] - F20/(2 M) (FourVector[2 p' + k, α] - (GS[p' + k] - M).GA[α]))];

In[10]:= P2 = P1 /. {p → -p', p' → -p};
```

Contraction of the lepton and proton tensors:

In[11]:=
```
Output1 = Simplify[Contract[L1 P1]];
Output2 = Simplify[Contract[L1 P2]];
Output3 = Simplify[Contract[L2 P1]];
Output4 = Simplify[Contract[L2 P2]];
```

Convenient notations for the products of the four-momenta:

In[15]:=
```
ScalarProduct[k, l] = kfli;
ScalarProduct[k, l'] = kflf;
ScalarProduct[k, p] = kfpi;
ScalarProduct[k, p'] = kfpf;
ScalarProduct[l, l'] = lilf;
ScalarProduct[l, p] = lipi;
ScalarProduct[l, p'] = lipf;
ScalarProduct[p, p'] = pipf;
ScalarProduct[l', p] = lfpi;
ScalarProduct[l', p'] = lfpf;
```

Output to the text files:

In[25]:=
```
CForm[Output1] >> "cform_int1.txt";
CForm[Output2] >> "cform_int2.txt";
CForm[Output3] >> "cform_int3.txt";
CForm[Output4] >> "cform_int4.txt";
```