Anisotropic Magnetized Asteroseismic Waves

This notebook contains lengthy algebraic manipulations using Mathematica to obtain an analytical formula for the magnetically-modified eigenfrequencies of waves in a polytropic atmosphere.

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Below are the matrix elements presented in Appendix A of the paper.

In[1]:=
```
M11 = -Ω^2 (1 + γ ϵ^2 / 2);
M12 = 0;
M13 = (-I K_X (n + 1) (1 + γ ϵ^2 / 2)) / γ;
M21 = ϵ^2 K_X K_Y Z;
M22 = -Ω^2 (1 + γ ϵ^2 / 2) + ϵ^2 K_X^2 Z;
M23 = (-I K_Y (n + 1) (1 + γ ϵ^2 / 2)) / γ;
M31 = (I K_X / γ) (1 + (3 γ ϵ^2)/2 + (ϵ^2 K_X^2 Z (1 + γ ϵ^2 / 2)) / (Ω^2 (1 + γ ϵ^2 / 2)));
M32 = (I K_Y / γ) (1 + (γ ϵ^2)/2 + (ϵ^2 K_X^2 Z (1 + γ ϵ^2 / 2)) / (Ω^2 (1 + γ ϵ^2 / 2)));
M33 = (-Ω^2 (1 + γ ϵ^2 / 2) + ϵ^2 K_X^2 Z) / (n + 1);
h_X = I K_X Z χ;
h_Y = I K_Y Z χ (1 + ϵ^2);
h0 = (1 + ϵ^2 (1 + (K_X^2 Z (γ - (n + 1) (1 + γ ϵ^2 / 2))) / ((n + 1) γ Ω^2 (1 + γ ϵ^2 / 2))));
h1 = (Z / (n + 1)) (1 + ϵ^2 (1 + K_X^2 Z / (Ω^2 (1 + γ ϵ^2 / 2))));
h_Z = χ * h0 + D[χ[Z], Z] * h1;
Minv = Inverse[({{M11, M12, M13}, {M21, M22, M23}, {M31, M32, M33}})];
```

Equation (22) of the paper is changed to Eq . (23) below using matrix

inversion technique.

In[16]:=
```
ufullhaschi = Dot[Minv, {hχ/χ, hγ/χ, h0}];

uxchi = ufullhaschi[[1]];
uychi = ufullhaschi[[2]];
uzchi = ufullhaschi[[3]];

ufullhasderivativeofchi = Dot[Minv, {0, 0, h1}];
uxdervchi = ufullhasderivativeofchi [[1]];
uydervchi = ufullhasderivativeofchi [[2]];
uzdervchi = ufullhasderivativeofchi [[3]];

ux = uxchi * χ + uxdervchi * D[χ[Z], Z];
uy = uychi * χ + uydervchi * D[χ[Z], Z];
uz = uzchi * χ + uzdervchi * D[χ[Z], Z];
```

Equation (24) of the paper is obtained next .

In[27]:=
```
(*-------------------------------------------------------------------------
*)
(*i kx ux + i ky uy + dz(uz) = χ;
i kx ux + i ky uy + dz(uz) - χ = 0;
SchrodingerformSECONDDERIVATIVEchi D^2χ +
  SchrodingerformFIRSTDERIVATIVEchi Dχ +
  SchrodingerformZERODERIVATIVEchi_original χ - χ= 0;
SchrodingerformSECONDDERIVATIVEchi D^2χ +
  SchrodingerformFIRSTDERIVATIVEchi Dχ +
  (SchrodingerformZERODERIVATIVEchi_original - 1) χ = 0;
SchrodingerformSECONDDERIVATIVEchi D^2χ +
  SchrodingerformFIRSTDERIVATIVEchi Dχ +
  (SchrodingerformZERODERIVATIVEchi) χ = 0*)

SchrodingerformZERODERIVATIVEchi = I * Kχ * uxchi + I * Kγ * uychi + D[uzchi , Z] - 1;
SchrodingerformFIRSTDERIVATIVEchi =
  I * Kχ * uxdervchi + I * Kγ * uydervchi + (uzchi + D[uzdervchi, Z]);
SchrodingerformSECONDDERIVATIVEchi = 0 + 0 + uzdervchi;
```

Equation (24) of the paper is recast in the form of Eq . (26) below .

In[30]:=
```
(*------------------------------------------------------------------------------
*)
(* D^2χ + f(Z) * Dχ + r(Z)* χ = 0, Following the arxiv paper v2,
https://arxiv.org/pdf/1812.06947v2.pdf *)

f[Z_] := SchrodingerformFIRSTDERIVATIVEchi / SchrodingerformSECONDDERIVATIVEchi;
r[Z_] := SchrodingerformZERODERIVATIVEchi / SchrodingerformSECONDDERIVATIVEchi;
```

In[32]:=
```
(*------------------------------------------------------------------------------
                                                    ---------*)
(*Tolstoy equation/Normal-form here*)
(*d^2ψ/dZ^2 + Q(Z,ϵ) ψ = 0*)
(*d^2ψ/dZ^2 + Γ^2(Z,ϵ) ψ = 0*)

Q[Z_] := r[Z] - (f[Z])^2/4 - D[f[Z], Z]/2;
Gammafreq[Z_] := Sqrt[Q[Z]]
```

Next shown is the expression of Γ (Z, ϵ) that appears in Eq . (26) of the paper .

In[34]:=
```
Gammafreq[Z]
```

Out[34]=

$$\sqrt{-\left(\left((1+n)^2\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\cdots 1\cdots}{1+n}-\frac{\cdots 1\cdots}{\gamma^2}\right)-\frac{i\,\cdots 2\cdots\left(\cdots 1\cdots\right)}{\gamma}\right)^2\right.\right.}$$

$$\left.\left.\left(-\frac{Z\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)\left(1+\cdots 1\cdots\right)\left(\cdots 1\cdots\right)}{(1+n)\left(\left(\cdots 1\cdots\right)\cdots 1\cdots-\cdots 1\cdots\right)^2}+\cdots 9\cdots+\frac{i\,Z\,K_X\left(\cdots 1\cdots\right)}{\left(\cdots 1\cdots\right)\cdots 1\cdots-\cdots 1\cdots}\right)^2\right)\Big/\left(4Z^2\right.\right.$$

$$\left.\left.\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)^2\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)^2\right)\right)+\frac{1}{2}\left(\cdots 5\cdots+\frac{\cdots 1\cdots}{\cdots 1\cdots}\right)+$$

$$\frac{(1+n)\left(\cdots 1\cdots\right)\left(\cdots 15\cdots+i\,K_X\left(\frac{i\,(1+n)\cdots 3\cdots\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-\cdots 1\cdots\right)K_X^2}{(1+n)\,\gamma\left(\cdots 1\cdots\right)\Omega^2}\right)\right)}{\gamma\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\cdots 1\cdots}{1+n}-\frac{\cdots 1\cdots}{\gamma^2}\right)-\frac{\cdots 1\cdots}{\gamma}\right)}+\frac{\cdots 1\cdots}{\cdots 1\cdots}+\frac{i\,Z\left(\cdots 1\cdots\right)\left(\cdots 1\cdots-\cdots 1\cdots\right)}{\left(\cdots 1\cdots\right)\cdots 1\cdots-\cdots 1\cdots}\right)\right)}{Z\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)}$$

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Following Eq . (28) of the paper, Γ (Z, ϵ) is expanded in powers of ϵ .

In[35]:=

```
Gammaexpanded = Normal[Series[Gammafreq[Z], {ϵ, 0, 2}]]
```

Out[35]=

$$\frac{1}{2}\sqrt{\left(\frac{1}{Z^2\,\gamma^2\,\Omega^2}\left(-2\,n\,\gamma^2\,\Omega^2-n^2\,\gamma^2\,\Omega^2+4\,Z\,\gamma^2\,\Omega^4-4\,Z\,K_X^2-8\,n\,Z\,K_X^2-4\,n^2\,Z\,K_X^2+4\,n\,Z\,\gamma\,K_X^2+4\,n^2\,Z\,\gamma\,K_X^2-4\,Z^2\,\gamma^2\,\Omega^2\,K_X^2-4\,Z\,K_Y^2-8\,n\,Z\,K_Y^2-4\,n^2\,Z\,K_Y^2+4\,n\,Z\,\gamma\,K_Y^2+4\,n^2\,Z\,\gamma\,K_Y^2-4\,Z^2\,\gamma^2\,\Omega^2\,K_Y^2\right)\right)}+\left(Z\,\epsilon^2\sqrt{\left(\frac{1}{Z^2\,\gamma^2\,\Omega^2}\left(-2\,n\,\gamma^2\,\Omega^2-n^2\,\gamma^2\,\Omega^2+4\,Z\,\gamma^2\,\Omega^4-4\,Z\,K_X^2-8\,n\,Z\,K_X^2-4\,n^2\,Z\,K_X^2+4\,n\,Z\,\gamma\,K_X^2+4\,n^2\,Z\,\gamma\,K_X^2-4\,Z^2\,\gamma^2\,\Omega^2\,K_X^2-4\,Z\,K_Y^2-8\,n\,Z\,K_Y^2-4\,n^2\,Z\,K_Y^2+4\,n\,Z\,\gamma\,K_Y^2+4\,n^2\,Z\,\gamma\,K_Y^2-4\,Z^2\,\gamma^2\,\Omega^2\,K_Y^2\right)\right)}\left(-2\,\gamma^4\,\Omega^{10}+\gamma^5\,\Omega^{10}+4\,\gamma^2\,\Omega^6\,K_X^2+8\,n\,\gamma^2\,\Omega^6\,K_X^2+4\,n^2\,\gamma^2\,\Omega^6\,K_X^2-4\,\gamma^3\,\Omega^6\,K_X^2-8\,n\,\gamma^3\,\Omega^6\,K_X^2-4\,n^2\,\gamma^3\,\Omega^6\,K_X^2+3\,n\,\gamma^4\,\Omega^6\,K_X^2+2\,n^2\,\gamma^4\,\Omega^6\,K_X^2-2\,Z\,\gamma^4\,\Omega^8\,K_X^2-2\,\Omega^2\,K_X^4-8\,n\,\Omega^2\,K_X^4-12\,n^2\,\Omega^2\,K_X^4-8\,n^3\,\Omega^2\,K_X^4-2\,n^4\,\Omega^2\,K_X^4+3\,\gamma\,\Omega^2\,K_X^4+12\,n\,\gamma\,\Omega^2\,K_X^4+18\,n^2\,\gamma\,\Omega^2\,K_X^4+12\,n^3\,\gamma\,\Omega^2\,K_X^4+3\,n^4\,\gamma\,\Omega^2\,K_X^4-n\,\gamma^2\,\Omega^2\,K_X^4-4\,n^2\,\gamma^2\,\Omega^2\,K_X^4-5\,n^3\,\gamma^2\,\Omega^2\,K_X^4-2\,n^4\,\gamma^2\,\Omega^2\,K_X^4-4\,Z\,\gamma^3\,\Omega^4\,K_X^4-6\,n\,Z\,\gamma^3\,\Omega^4\,K_X^4-2\,n^2\,Z\,\gamma^3\,\Omega^4\,K_X^4+4\,Z^2\,\gamma^4\,\Omega^6\,K_X^4+2\,Z\,K_X^6+8\,n\,Z\,K_X^6+12\,n^2\,Z\,K_X^6+8\,n^3\,Z\,K_X^6+2\,n^4\,Z\,K_X^6+2\,n\,Z\,\gamma\,K_X^6+6\,n^2\,Z\,\gamma\,K_X^6+6\,n^3\,Z\,\gamma\,K_X^6+2\,n^4\,Z\,\gamma\,K_X^6-4\,Z^2\,\gamma^2\,\Omega^2\,K_X^6-8\,n\,Z^2\,\gamma^2\,\Omega^2\,K_X^6-4\,n^2\,Z^2\,\gamma^2\,\Omega^2\,K_X^6+4\,\gamma^2\,\Omega^6\,K_Y^2+8\,n\,\gamma^2\,\Omega^6\,K_Y^2+4\,n^2\,\gamma^2\,\Omega^6\,K_Y^2-2\,\gamma^3\,\Omega^6\,K_Y^2-4\,n\,\gamma^3\,\Omega^6\,K_Y^2-2\,n^2\,\gamma^3\,\Omega^6\,K_Y^2-4\,\Omega^2\,K_X^2\,K_Y^2-16\,n\,\Omega^2\,K_X^2\,K_Y^2-24\,n^2\,\Omega^2\,K_X^2\,K_Y^2-16\,n^3\,\Omega^2\,K_X^2\,K_Y^2-4\,n^4\,\Omega^2\,K_X^2\,K_Y^2+4\,\gamma\,\Omega^2\,K_X^2\,K_Y^2+16\,n\,\gamma\,\Omega^2\,K_X^2\,K_Y^2+24\,n^2\,\gamma\,\Omega^2\,K_X^2\,K_Y^2+16\,n^3\,\gamma\,\Omega^2\,K_X^2\,K_Y^2+4\,n^4\,\gamma\,\Omega^2\,K_X^2\,K_Y^2+n\,\gamma^2\,\Omega^2\,K_X^2\,K_Y^2-3\,n^3\,\gamma^2\,\Omega^2\,K_X^2\,K_Y^2-2\,n^4\,\gamma^2\,\Omega^2\,K_X^2\,K_Y^2-4\,Z\,\gamma^2\,\Omega^4\,K_X^2\,K_Y^2-8\,n\,Z\,\gamma^2\,\Omega^4\,K_X^2\,K_Y^2-4\,n^2\,Z\,\gamma^2\,\Omega^4\,K_X^2\,K_Y^2-8\,Z\,\gamma^3\,\Omega^4\,K_X^2\,K_Y^2-6\,n\,Z\,\gamma^3\,\Omega^4\,K_X^2\,K_Y^2+2\,n^2\,Z\,\gamma^3\,\Omega^4\,K_X^2\,K_Y^2+8\,Z\,K_X^4\,K_Y^2+32\,n\,Z\,K_X^4\,K_Y^2+48\,n^2\,Z\,K_X^4\,K_Y^2+32\,n^3\,Z\,K_X^4\,K_Y^2+8\,n^4\,Z\,K_X^4\,K_Y^2-4\,Z^2\,\gamma^2\,\Omega^2\,K_X^4\,K_Y^2-8\,n\,Z^2\,\gamma^2\,\Omega^2\,K_X^4\,K_Y^2-4\,n^2\,Z^2\,\gamma^2\,\Omega^2\,K_X^4\,K_Y^2-2\,\Omega^2\,K_Y^4-8\,n\,\Omega^2\,K_Y^4-12\,n^2\,\Omega^2\,K_Y^4-8\,n^3\,\Omega^2\,K_Y^4-2\,n^4\,\Omega^2\,K_Y^4+\gamma\,\Omega^2\,K_Y^4+4\,n\,\gamma\,\Omega^2\,K_Y^4+6\,n^2\,\gamma\,\Omega^2\,K_Y^4+4\,n^3\,\gamma\,\Omega^2\,K_Y^4+n^4\,\gamma\,\Omega^2\,K_Y^4+6\,Z\,K_X^2\,K_Y^4+24\,n\,Z\,K_X^2\,K_Y^4+36\,n^2\,Z\,K_X^2\,K_Y^4+24\,n^3\,Z\,K_X^2\,K_Y^4+6\,n^4\,Z\,K_X^2\,K_Y^4-2\,n\,Z\,\gamma\,K_X^2\,K_Y^4-6\,n^2\,Z\,\gamma\,K_X^2\,K_Y^4-6\,n^3\,Z\,\gamma\,K_X^2\,K_Y^4-2\,n^4\,Z\,\gamma\,K_X^2\,K_Y^4\right)\Big/\left(2\,\Omega^2\left(\gamma^2\,\Omega^4-K_X^2-2\,n\,K_X^2-n^2\,K_X^2-K_Y^2-2\,n\,K_Y^2-n^2\,K_Y^2\right)\left(-2\,n\,\gamma^2\,\Omega^2-n^2\,\gamma^2\,\Omega^2+4\,Z\,\gamma^2\,\Omega^4-4\,Z\,K_X^2-8\,n\,Z\,K_X^2-4\,n^2\,Z\,K_X^2+4\,n\,Z\,\gamma\,K_X^2+4\,n^2\,Z\,\gamma\,K_X^2-4\,Z^2\,\gamma^2\,\Omega^2\,K_X^2-4\,Z\,K_Y^2-8\,n\,Z\,K_Y^2-4\,n^2\,Z\,K_Y^2+4\,n\,Z\,\gamma\,K_Y^2+4\,n^2\,Z\,\gamma\,K_Y^2-4\,Z^2\,\gamma^2\,\Omega^2\,K_Y^2\right)\right)$$

In[36]:=
```
numeratorofintendedterm =
 (-2 γ^4 Ω^10 + γ^5 Ω^10 + 4 γ^2 Ω^6 K_X^2 + 8 n γ^2 Ω^6 K_X^2 + 4 n^2 γ^2 Ω^6 K_X^2 - 4 γ^3 Ω^6 K_X^2 - 8 n γ^3 Ω^6 K_X^2 -
  4 n^2 γ^3 Ω^6 K_X^2 + 3 n γ^4 Ω^6 K_X^2 + 2 n^2 γ^4 Ω^6 K_X^2 - 2 Z γ^4 Ω^8 K_X^2 - 2 Ω^2 K_X^4 - 8 n Ω^2 K_X^4 - 12 n^2 Ω^2 K_X^4 -
  8 n^3 Ω^2 K_X^4 - 2 n^4 Ω^2 K_X^4 + 3 γ Ω^2 K_X^4 + 12 n γ Ω^2 K_X^4 + 18 n^2 γ Ω^2 K_X^4 + 12 n^3 γ Ω^2 K_X^4 + 3 n^4 γ Ω^2 K_X^4 -
  n γ^2 Ω^2 K_X^4 - 4 n^2 γ^2 Ω^2 K_X^4 - 5 n^3 γ^2 Ω^2 K_X^4 - 2 n^4 γ^2 Ω^2 K_X^4 - 4 Z γ^3 Ω^4 K_X^4 - 6 n Z γ^3 Ω^4 K_X^4 -
  2 n^2 Z γ^3 Ω^4 K_X^4 + 4 Z^2 γ^4 Ω^6 K_X^4 + 2 Z K_X^6 + 8 n Z K_X^6 + 12 n^2 Z K_X^6 + 8 n^3 Z K_X^6 + 2 n^4 Z K_X^6 +
  2 n Z γ K_X^6 + 6 n^2 Z γ K_X^6 + 6 n^3 Z γ K_X^6 + 2 n^4 Z γ K_X^6 - 4 Z^2 γ^2 Ω^2 K_X^6 - 8 n Z^2 γ^2 Ω^2 K_X^6 -
  4 n^2 Z^2 γ^2 Ω^2 K_X^6 + 4 γ^2 Ω^6 K_Y^2 + 8 n γ^2 Ω^6 K_Y^2 + 4 n^2 γ^2 Ω^6 K_Y^2 - 2 γ^3 Ω^6 K_Y^2 - 4 n γ^3 Ω^6 K_Y^2 -
  2 n^2 γ^3 Ω^6 K_Y^2 - 4 Ω^2 K_X^2 K_Y^2 - 16 n Ω^2 K_X^2 K_Y^2 - 24 n^2 Ω^2 K_X^2 K_Y^2 - 16 n^3 Ω^2 K_X^2 K_Y^2 - 4 n^4 Ω^2 K_X^2 K_Y^2 +
  4 γ Ω^2 K_X^2 K_Y^2 + 16 n γ Ω^2 K_X^2 K_Y^2 + 24 n^2 γ Ω^2 K_X^2 K_Y^2 + 16 n^3 γ Ω^2 K_X^2 K_Y^2 + 4 n^4 γ Ω^2 K_X^2 K_Y^2 +
  n γ^2 Ω^2 K_X^2 K_Y^2 - 3 n^3 γ^2 Ω^2 K_X^2 K_Y^2 - 2 n^4 γ^2 Ω^2 K_X^2 K_Y^2 - 4 Z γ^2 Ω^4 K_X^2 K_Y^2 - 8 n Z γ^2 Ω^4 K_X^2 K_Y^2 -
  4 n^2 Z γ^2 Ω^4 K_X^2 K_Y^2 - 8 Z γ^3 Ω^4 K_X^2 K_Y^2 - 6 n Z γ^3 Ω^4 K_X^2 K_Y^2 + 2 n^2 Z γ^3 Ω^4 K_X^2 K_Y^2 + 8 Z K_X^4 K_Y^2 +
  32 n Z K_X^4 K_Y^2 + 48 n^2 Z K_X^4 K_Y^2 + 32 n^3 Z K_X^4 K_Y^2 + 8 n^4 Z K_X^4 K_Y^2 - 4 Z^2 γ^2 Ω^2 K_X^4 K_Y^2 - 8 n Z^2 γ^2 Ω^2 K_X^4 K_Y^2 -
  4 n^2 Z^2 γ^2 Ω^2 K_X^4 K_Y^2 - 2 Ω^2 K_Y^4 - 8 n Ω^2 K_Y^4 - 12 n^2 Ω^2 K_Y^4 - 8 n^3 Ω^2 K_Y^4 - 2 n^4 Ω^2 K_Y^4 + γ Ω^2 K_Y^4 +
  4 n γ Ω^2 K_Y^4 + 6 n^2 γ Ω^2 K_Y^4 + 4 n^3 γ Ω^2 K_Y^4 + n^4 γ Ω^2 K_Y^4 + 6 Z K_X^2 K_Y^4 + 24 n Z K_X^2 K_Y^4 + 36 n^2 Z K_X^2 K_Y^4 +
  24 n^3 Z K_X^2 K_Y^4 + 6 n^4 Z K_X^2 K_Y^4 - 2 n Z γ K_X^2 K_Y^4 - 6 n^2 Z γ K_X^2 K_Y^4 - 6 n^3 Z γ K_X^2 K_Y^4 - 2 n^4 Z γ K_X^2 K_Y^4) ;
```

In[37]:=
```
FullSimplify[Coefficient[numeratorofintendedterm , Z, 2]]
```

Out[37]=
$$-4\,\gamma^2\,\Omega^2\,K_X^4\,\left(-\gamma^2\,\Omega^4+(1+n)^2\,K_X^2+(1+n)^2\,K_Y^2\right)$$

In[38]:=
```
FullSimplify[Coefficient[numeratorofintendedterm /
    (2 Ω^2 * (γ^2 Ω^4 - K_X^2 - 2 n K_X^2 - n^2 K_X^2 - K_Y^2 - 2 n K_Y^2 - n^2 K_Y^2) * (γ Ω * 2 I γ Ω K)) , Z, 2]]
```

Out[38]=
$$-\frac{i\,K_X^4}{K\,\Omega^2}$$

The following expression is b_2 that appears in $\Gamma_2 = \dfrac{b_2\,Z^2+b_1\,Z+b_0}{\sqrt{(Z-\alpha)\,(Z-\beta)}}$.

In[39]:=
```
FullSimplify[Coefficient[numeratorofintendedterm /
    (2 Ω^2 * (γ^2 Ω^4 - K_X^2 - 2 n K_X^2 - n^2 K_X^2 - K_Y^2 - 2 n K_Y^2 - n^2 K_Y^2) * (γ Ω * 2 I γ Ω K)) ,
  Z, 2] /. K_X → K Cos[θ] /. K_Y → K Sin[θ]]
```

Out[39]=
$$-\frac{i\,K^3\,\text{Cos}[\theta]^4}{\Omega^2}$$

The following expression is b_1 that appears in $\Gamma_2 = \dfrac{b_2\,Z^2+b_1\,Z+b_0}{\sqrt{(Z-\alpha)\,(Z-\beta)}}$.

In[40]:=
```
FullSimplify[Coefficient[numeratorofintendedterm /
    (2 Ω^2 * (γ^2 Ω^4 - K_X^2 - 2 n K_X^2 - n^2 K_X^2 - K_Y^2 - 2 n K_Y^2 - n^2 K_Y^2) * (γ Ω * 2 I γ Ω K)),
  Z, 1] /. K_X → K Cos[θ] /. K_Y → K Sin[θ]]
```

Out[40]=
$$\left(i\, K \cos[\theta]^2 \left(2 K^4 (1+n)^4 - K^2 (1+n)\, \gamma^2 (1+n+3\gamma)\, \Omega^4 - \gamma^4 \Omega^8 + K^2 (1+n) \left(K^2 (1+n)^2 (-1+n(-1+\gamma)) + \gamma^2 (1+n+\gamma-n\gamma)\, \Omega^4\right) \cos[2\theta]\right)\right) / \left(2\gamma^2 \Omega^4 \left(K^2 (1+n)^2 - \gamma^2 \Omega^4\right)\right)$$

The following expression is b_0 that appears in $\Gamma_2 = \dfrac{b_2 Z^2 + b_1 Z + b_0}{\sqrt{(Z-\alpha)(Z-\beta)}}$.

In[41]:=
```
FullSimplify[Coefficient[numeratorofintendedterm /
    (2 Ω^2 * (γ^2 Ω^4 - K_X^2 - 2 n K_X^2 - n^2 K_X^2 - K_Y^2 - 2 n K_Y^2 - n^2 K_Y^2) * (γ Ω * 2 I γ Ω K)),
  Z, 0] /. K_X → K Cos[θ] /. K_Y → K Sin[θ]]
```

Out[41]=
$$-\frac{1}{16 K^3 (1+n)^2 \gamma^2 \Omega^2 - 16 K \gamma^4 \Omega^6}\, i \left(K^4 (1+n)^2 \left(8(1+n)^2 - 8(1+n)^2\gamma + n(1+4n)\gamma^2\right) - 2K^2\gamma^2 \left(8(1+n)^2 - 6(1+n)^2\gamma + n(3+2n)\gamma^2\right)\Omega^4 - 4(-2+\gamma)\gamma^4\Omega^8 + 2K^2\gamma \left(K^2(1+n)^2(-2+n(-4+2n(-1+\gamma)+\gamma)) + \gamma^2\left(2(1+n)^2 - n(3+2n)\gamma\right)\Omega^4\right) \cos[2\theta] + K^4 n (1+n)^2 \gamma^2 \cos[4\theta]\right)$$

The next cell displays an expression of the form $(Z-\alpha)(Z-\beta) = Z^2 - (\alpha+\beta) Z + \alpha\beta = 0$.

In[42]:=
```
lamb2TPpolynomial = Simplify[
  ((-2 n γ^2 Ω^2 - n^2 γ^2 Ω^2 + 4 Z γ^2 Ω^4 - 4 Z K_X^2 - 8 n Z K_X^2 - 4 n^2 Z K_X^2 + 4 n Z γ K_X^2 + 4 n^2 Z γ K_X^2 -
      4 Z^2 γ^2 Ω^2 K_X^2 - 4 Z K_Y^2 - 8 n Z K_Y^2 - 4 n^2 Z K_Y^2 + 4 n Z γ K_Y^2 + 4 n^2 Z γ K_Y^2 - 4 Z^2 γ^2 Ω^2 K_Y^2) /
    (-4 γ^2 Ω^2 K^2)) /. K_X → K Cos[θ] /. K_Y → K Sin[θ]]
```

Out[42]=
$$\frac{2n + n^2 - 4Z\Omega^2}{4K^2} + \frac{Z\left(1 - n(-2+\gamma) - n^2(-1+\gamma) + Z\gamma^2\Omega^2\right)}{\gamma^2\Omega^2}$$

In[43]:=
```
FullSimplify[Coefficient[lamb2TPpolynomial , Z, 2]] (*This is 1.*)
```

Out[43]=
$$1$$

In[44]:=
```
FullSimplify[Coefficient[lamb2TPpolynomial , Z, 1]] (*This is -(α+β). *)
```

Out[44]=
$$\frac{(1+n)(1+n-n\gamma)}{\gamma^2\Omega^2} - \frac{\Omega^2}{K^2}$$

In[45]:=
```
FullSimplify[Coefficient[lamb2TPpolynomial , Z, 0]] (*This is α β. *)
```

Out[45]=
$$\frac{n(2+n)}{4K^2}$$

(*The full expression of Γ(Z,ϵ) is given below. Disclaimer: The expression presented below is of exhaustive length.*)

In[46]:= `Gammafreq [Z]`

Out[46]=

$$\sqrt{\Bigg(\Bigg(-\Bigg(\Bigg((1+n)^2 \Bigg(\Big(-\Big(\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2\Big)+Z\epsilon^2K_X^2\Big)\Bigg(-\frac{\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2\Big(-\Big(\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2\Big)+Z\epsilon^2K_X^2\Big)}{1+n}-}$$

$$\frac{(1+n)\Big(1+\frac{\gamma\epsilon^2}{2}\Big)K_X^2\Big(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\Big)}{\gamma^2}\Bigg)-$$

$$\frac{i\Big(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\Big)K_Y\Bigg(\frac{i(1+n)\Big(1+\frac{\gamma\epsilon^2}{2}\Big)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\Big(1+\frac{\gamma\epsilon^2}{2}\Big)K_X^2K_Y}{\gamma}\Bigg)}{\gamma}\Bigg)^2$$

$$\Bigg(-\Bigg(\Bigg(Z\Big(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\Big)$$

$$\Bigg(1+\epsilon^2\Bigg(1+\frac{ZK_X^2}{\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2}\Bigg)\Bigg)\Bigg)\Bigg(\Big(-\Big(\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2\Big)+Z\epsilon^2K_X^2\Big)$$

$$\Bigg(-\frac{\epsilon^2\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2K_X^2}{1+n}-\frac{(1+n)\epsilon^2\Big(1+\frac{\gamma\epsilon^2}{2}\Big)K_X^4}{\gamma^2\Omega^2}\Bigg)+$$

$$\epsilon^2K_X^2\Bigg(-\frac{\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2\Big(-\Big(\Big(1+\frac{\gamma\epsilon^2}{2}\Big)\Omega^2\Big)+Z\epsilon^2K_X^2\Big)}{1+n}-$$

$$\frac{(1+n)\Big(1+\frac{\gamma\epsilon^2}{2}\Big)K_X^2\Big(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\Big)}{\gamma^2}\Bigg)+$$

$$\frac{(1+n)\epsilon^2\Big(1+\frac{\gamma\epsilon^2}{2}\Big)K_X^2\Big(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\Big)K_Y^2}{\gamma^2}-$$

$$\left.\left.\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\right)\right)\Bigg/\Bigg(\Bigg(1+$$

$$n)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\right.$$

$$\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^2\right)\right)+$$

$$\left(Z\,\epsilon^2\,K_X^2\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right)\Bigg/$$

$$\left(\left((1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\right.\right.\right.$$

$$\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)-$$

$$\left.\left.\left(Z\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\right)\Bigg/$$

$$\left(\gamma \left(\left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right)}{1+n} - \right. \right. \right.$$

$$\left. \left. \left. \frac{(1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 \left(1 + \frac{3 \gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \right.$$

$$\left. \left. \frac{i \left(1 + \frac{\gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right) K_Y \left(\frac{i (1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right)^2 \Omega^2 K_Y}{\gamma} + \frac{i (1+n) Z \epsilon^2 \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 K_Y}{\gamma} \right)}{\gamma} \right) \right) +$$

$$\left(Z \left(-\epsilon^2 \Omega^2 K_X^2 - \frac{1}{2} \gamma \epsilon^4 \Omega^2 K_X^2 \right) \left(1 + \epsilon^2 \left(1 + \frac{Z K_X^2}{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2} \right) \right) \right) \Big/ \left((1+n) \right.$$

$$\left(\left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right)}{1+n} - \right. \right.$$

$$\left. \left. \frac{(1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 \left(1 + \frac{3 \gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \right.$$

$$\left. \left. \frac{i \left(1 + \frac{\gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right) K_Y \left(\frac{i (1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right)^2 \Omega^2 K_Y}{\gamma} + \frac{i (1+n) Z \epsilon^2 \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 K_Y}{\gamma} \right)}{\gamma} \right) \right) +$$

$$\left(\left(\Omega^4 + \gamma \epsilon^2 \Omega^4 + \frac{1}{4} \gamma^2 \epsilon^4 \Omega^4 - Z \epsilon^2 \Omega^2 K_X^2 - \frac{1}{2} Z \gamma \epsilon^4 \Omega^2 K_X^2 \right) \right.$$

$$\left. \left(1 + \epsilon^2 \left(1 + \frac{Z K_X^2}{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2} \right) \right) \right) \Big/ \left((1+n) \right.$$

$$\left(\left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right)}{1+n} - \right. \right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\Bigg(\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\gamma\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Big/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)-$$

$$\left(Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2\right)\Big/$$

$$\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(\mathrm{i}\, Z \left(1+\epsilon^2 \left(1+\frac{Z\, K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2}\right)\right)\, K_Y \left(-\frac{\mathrm{i}\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma} - \frac{\mathrm{i}\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)\right) \Big/ \left((1+n)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n} - \frac{(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right) - \frac{\mathrm{i}\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)\,K_Y\left(\frac{\mathrm{i}\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{\mathrm{i}\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right) +$$

$$\left(\mathrm{i}\, Z\, K_X\left(\frac{\mathrm{i}\,\Omega^2\,K_X}{\gamma}+2\,\mathrm{i}\,\epsilon^2\,\Omega^2\,K_X+\frac{3}{4}\,\mathrm{i}\,\gamma\,\epsilon^4\,\Omega^2\,K_X-\mathrm{i}\,Z\,\epsilon^4\,K_X^3-\frac{\mathrm{i}\,Z^2\,\epsilon^4\,K_X^5}{\gamma\,\Omega^2}+\frac{\mathrm{i}\,Z\,\epsilon^2\,K_X\,K_Y^2}{\gamma}+\frac{1}{2}\,\mathrm{i}\,Z\,\epsilon^4\,K_X\,K_Y^2+\frac{\mathrm{i}\,Z^2\,\epsilon^4\,K_X^3\,K_Y^2}{\gamma\,\Omega^2}\right)\right) \Big/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n} - \frac{(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right) - \frac{\mathrm{i}\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)\,K_Y\left(\frac{\mathrm{i}\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{\mathrm{i}\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)^2 \Big/$$

$$\left(4\,Z^2\,\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)^2\right.$$

$$\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)^2\Bigg)\Bigg)+$$

$$\frac{1}{2}\left(-\left(\left(\left(1+n\right)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)$$

$$\left(\left(2\,Z\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right.\right.$$

$$\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\right.$$

$$\left(-\frac{\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\,K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+$$

$$\epsilon^2\,K_X^2\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+$$

$$\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\left.\left.\left.\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\right)^2\right)\Bigg/\left(\left(1+n\right)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^3-$$

$$\left(Z\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\left(2\,\epsilon^2\,K_X^2\left(-\frac{\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\,K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+\frac{2\,(1+n)\,\epsilon^4\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4\,K_Y^2}{\gamma^2\,\Omega^2}\right)\Big/\left((1+n)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^2-\left(2\,Z\,\epsilon^2\,K_X^2\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right.$$

$$\left(\left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right) \right.$$

$$\left(-\frac{\epsilon^2 \left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 K_X^2}{1+n} - \frac{(1+n)\, \epsilon^2 \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^4}{\gamma^2 \Omega^2} \right) +$$

$$\epsilon^2 K_X^2 \left(-\frac{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right)}{1+n} - \right.$$

$$\left. \frac{(1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 \left(1 + \frac{3 \gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right)}{\gamma^2} \right) +$$

$$\frac{(1+n)\, \epsilon^2 \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 \left(1 + \frac{\gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right) K_Y^2}{\gamma^2} -$$

$$\left. \left. \frac{i\, \epsilon^2 K_X^2 K_Y \left(\frac{i\, (1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right)^2 \Omega^2 K_Y}{\gamma} + \frac{i\, (1+n)\, Z \epsilon^2 \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 K_Y}{\gamma} \right)}{\gamma \Omega^2} \right) \right) \Big/$$

$$\left((1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \left(\left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right) \right. \right.$$

$$\left(-\frac{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right)}{1+n} - \right.$$

$$\left. \frac{(1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 \left(1 + \frac{3 \gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right)}{\gamma^2} \right) -$$

$$\left. \left. \frac{i \left(1 + \frac{\gamma \epsilon^2}{2} + \frac{Z \epsilon^2 K_X^2}{\Omega^2} \right) K_Y \left(\frac{i\, (1+n) \left(1 + \frac{\gamma \epsilon^2}{2} \right)^2 \Omega^2 K_Y}{\gamma} + \frac{i\, (1+n)\, Z \epsilon^2 \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 K_Y}{\gamma} \right)}{\gamma} \right)^2 \right) +$$

$$\left(Z \left(1 + \frac{\gamma \epsilon^2}{2} \right) K_X^2 \left(-\left(\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2 \right) + Z \epsilon^2 K_X^2 \right) \left(1 + \epsilon^2 \left(1 + \frac{Z K_X^2}{\left(1 + \frac{\gamma \epsilon^2}{2} \right) \Omega^2} \right) \right) \right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\right.$$

$$\left(-\frac{\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\,K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+$$

$$\epsilon^2\,K_X^2\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+$$

$$\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\left.\left.\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\right)\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^2\right)-$$

$$\left(2\,Z\left(-\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\right.$$

$$\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2 K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+$$

$$\epsilon^2 K_X^2\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+$$

$$\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\left.\left.\frac{i\,\epsilon^2 K_X^2 K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i\,(1+n)\,Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\right)\right/\left((1+n)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i\,(1+n)\,Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\right)^2\right)-$$

$$\left(2\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2 K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2 K_X^2\right)\right.$$

$$\left(1+\epsilon^2\left(1+\frac{Z K_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\right.$$

$$\left.\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2 K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+\right.$$

$$\epsilon^2 K_X^2 \left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n} - \frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right) + \frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2} - \frac{i\epsilon^2 K_X^2 K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma\Omega^2}\Bigg)\Bigg) \Bigg/ \Bigg((1+n)$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n} - \frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right) - \frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\right)^2\Bigg) -$$

$$\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2 K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2 K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\gamma\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2 K_X^2}{1+n}-\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\Omega^2}\right)+\epsilon^2 K_X^2\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)+$$

$$\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\frac{i\epsilon^2K_X^2K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma\Omega^2}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)^2+$$

$$\Bigg(Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+$$

$$Z\epsilon^2K_X^2\right)\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2K_X^2}{1+n}-\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\Omega^2}\right)+$$

$$\epsilon^2K_X^2\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)+$$

$$\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\Bigg)^2\Bigg)-$$

$$\Bigg(i\,Z\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)K_Y\left(-\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}-$$

$$\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\Bigg)\Bigg(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)$$

$$\left(-\frac{\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\,K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+$$

$$\epsilon^2\,K_X^2\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+$$

$$\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\Bigg)\Bigg)\Bigg/\Bigg((1+n)$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^2-$$

$$\left(i\,Z\,K_X\left(\frac{i\,\Omega^2\,K_X}{\gamma}+2\,i\,\epsilon^2\,\Omega^2\,K_X+\frac{3}{4}\,i\,\gamma\,\epsilon^4\,\Omega^2\,K_X-i\,Z\,\epsilon^4\,K_X^3-\frac{i\,Z^2\,\epsilon^4\,K_X^5}{\gamma\,\Omega^2}+\frac{i\,Z\,\epsilon^2\,K_X\,K_Y^2}{\gamma}+\frac{1}{2}\,i\,Z\,\epsilon^4\,K_X\,K_Y^2+\frac{i\,Z^2\,\epsilon^4\,K_X^3\,K_Y^2}{\gamma\,\Omega^2}\right)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\,K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+\epsilon^2\,K_X^2\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\right)\Big/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\left(\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\left(\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)^2-$$

$$\left(Z\epsilon^2K_X^4\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\right)\Big/\left(\gamma\Omega^2\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)+$$

$$\left(2Z\epsilon^2K_X^2\left(-\epsilon^2\Omega^2K_X^2-\frac{1}{2}\gamma\epsilon^4\Omega^2K_X^2\right)\right)\Big/\left((1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)+$$

$$\left(2\,\epsilon^2\,K_X^2\,\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right)\Big/$$

$$\left((1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\,\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\right.\right.$$

$$\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\,\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\left.\frac{i\,\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)\,K_Y\,\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(\epsilon^2\,\left(\gamma-(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\right)\,K_X^2\,\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\right.\right.$$

$$\left.\left.\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right)\Big/\left((1+n)\,\gamma\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\,\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\,\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\frac{(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\left.\frac{i\,\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)\,K_Y\,\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)-$$

$$\left.\left(Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^4\,\left(1+\epsilon^2\,\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2}\right)\right)\right)\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)-$$

$$\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(2\left(-\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/\left((1+n)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right) K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\imath}(1+n) Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(\left(-\epsilon^2\Omega^2 K_X^2-\frac{1}{2}\gamma\epsilon^4\Omega^2 K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\right) K_X^2}{(1+n)\gamma\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right) K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\imath}(1+n) Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)-$$

$$\left(Z\epsilon^2\left(1+\epsilon^2\right)\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2 K_Y^2\right)\Big/\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)$$

$$\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right) K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\imath}(1+n) Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)-$$

$$\left(\left(1+\epsilon^2\right)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right) K_Y^2\right)\Big/$$

$$\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.$$

$$\left(\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left(\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)\Bigg)+$$

$$\left(Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)K_Y^2\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\left(\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.\right.\right.$$

$$\left.\left.\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)\right)\right)+$$

$$\left(iZ\epsilon^2K_X^2K_Y\left(-\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}-\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)\right)\Big/$$

$$\left((1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\right.\right.$$

$$\left.\left.\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\left(\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.\right.\right.$$

$$\left.\left.\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)\right)\right)+$$

$$\left(\dot{\imath}\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)K_Y\left(-\frac{\dot{\imath}\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}-\frac{\dot{\imath}\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)\right)\Big/\left((1+n)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{\dot{\imath}\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{\dot{\imath}\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{\dot{\imath}\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(\dot{\imath}\,Z\,K_X\left(-\dot{\imath}\,\epsilon^4\,K_X^3-\frac{2\,\dot{\imath}\,Z\,\epsilon^4\,K_X^5}{\gamma\,\Omega^2}+\frac{\dot{\imath}\,\epsilon^2\,K_X\,K_Y^2}{\gamma}+\frac{1}{2}\,\dot{\imath}\,\epsilon^4\,K_X\,K_Y^2+\frac{2\,\dot{\imath}\,Z\,\epsilon^4\,K_X^3\,K_Y^2}{\gamma\,\Omega^2}\right)\right)\Big/\left((1+n)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{\dot{\imath}\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{\dot{\imath}\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{\dot{\imath}\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(\dot{\imath}\,K_X\left(\frac{\dot{\imath}\,\Omega^2\,K_X}{\gamma}+2\,\dot{\imath}\,\epsilon^2\,\Omega^2\,K_X+\frac{3}{4}\,\dot{\imath}\,\gamma\,\epsilon^4\,\Omega^2\,K_X-\dot{\imath}\,Z\,\epsilon^4\,K_X^3-\frac{\dot{\imath}\,Z^2\,\epsilon^4\,K_X^5}{\gamma\,\Omega^2}+\frac{\dot{\imath}\,Z\,\epsilon^2\,K_X\,K_Y^2}{\gamma}+\frac{1}{2}\,\dot{\imath}\,Z\,\epsilon^4\,K_X\,K_Y^2+\frac{\dot{\imath}\,Z^2\,\epsilon^4\,K_X^3\,K_Y^2}{\gamma\,\Omega^2}\right)\right)\Big/\left((1+n)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(Z\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Bigg)-$$

$$\Bigg((1+n)\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2K_X^2}{1+n}-\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\Omega^2}\right)+$$

$$\epsilon^2K_X^2\Bigg(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)+$$

$$\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\frac{i\epsilon^2K_X^2K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma\Omega^2}\Bigg)$$

$$\Bigg(-\Bigg(\Bigg(Z\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)$$

$$\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2 K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\Omega^2}\right)+$$

$$\epsilon^2 K_X^2\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+$$

$$\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\left.\left.\frac{i\,\epsilon^2 K_X^2 K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i\,(1+n)\,Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma\Omega^2}\right)\right/\left((1+n)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\left.\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i\,(1+n)\,Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\right)^2\right)\right)+$$

$$\left(Z\epsilon^2 K_X^2\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2 K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2 K_X^2\right)\right)\Big/$$

$$\left((1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\right.\right.$$

$$\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)-$$

$$\left(Z\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/$$

$$\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(Z\left(-\epsilon^2\Omega^2K_X^2-\frac{1}{2}\gamma\epsilon^4\Omega^2K_X^2\right)\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/\Bigg((1+n)$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\Bigg(\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Bigg/\Bigg(\Bigg(1+n\Bigg)$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\Bigg(\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\,\gamma\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Bigg/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\Bigg)-$$

$$\left(Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2\right)\Bigg/$$

$$\Bigg(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(iZ\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)K_Y\left(-\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}-\right.\right.$$

$$\left.\left.\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)\right)\Bigg/\Bigg((1+n)$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(iZK_X\left(\frac{i\Omega^2K_X}{\gamma}+2i\epsilon^2\Omega^2K_X+\frac{3}{4}i\gamma\epsilon^4\Omega^2K_X-iZ\epsilon^4K_X^3-\frac{iZ^2\epsilon^4K_X^5}{\gamma\Omega^2}+\right.\right.$$

$$\left.\left.\frac{iZ\epsilon^2K_XK_Y^2}{\gamma}+\frac{1}{2}iZ\epsilon^4K_XK_Y^2+\frac{iZ^2\epsilon^4K_X^3K_Y^2}{\gamma\Omega^2}\right)\right)\Bigg/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\left.\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\imath}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\right)\right)\right)\Big/$$

$$\left(Z\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)\right.$$

$$\left.\left(1+\epsilon^2\left(1+\frac{Z K_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)+$$

$$\left((1+n)\epsilon^2K_X^2\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{\dot{\imath}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)$$

$$\left(-\left(\left(Z\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)\right.\right.\right.$$

$$\left.\left.\left(1+\epsilon^2\left(1+\frac{Z K_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\right.\right.$$

$$\left.\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2K_X^2}{1+n}-\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\Omega^2}\right)+\right.$$

$$\epsilon^2K_X^2\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+\right.$$

$$\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\frac{i\,\epsilon^2K_X^2K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i\,(1+n)\,Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\Bigg)\Bigg)\Bigg/\Bigg((1+n)$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i\,(1+n)\,Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)^2\right)\Bigg)+$$

$$\left(Z\epsilon^2K_X^2\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)\right)\Bigg/$$

$$\Bigg((1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)$$

$$\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i\,(1+n)\,Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)\Bigg)-$$

$$\left(Z\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Bigg/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(Z\left(-\epsilon^2\Omega^2K_X^2-\frac{1}{2}\gamma\epsilon^4\Omega^2K_X^2\right)\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/\left((1+n)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)\right.$$

$$\left.\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/\left((1+n)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-\right.\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\Bigg(\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\gamma\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Big/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)-$$

$$\left(Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2\right)\Big/$$

$$\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(\left(\mathrm{i}\, Z \left(1+\epsilon^2\left(1+\frac{Z\, K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right) K_Y \left(-\frac{\mathrm{i}\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\, K_Y}{\gamma} - \frac{\mathrm{i}\,(1+n)\, Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right) K_X^2\, K_Y}{\gamma}\right)\right)\Big/\left((1+n)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\, K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\, K_X^2\right)}{1+n} - \frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right) K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\, K_X^2}{\Omega^2}\right)}{\gamma^2}\right) - \frac{\mathrm{i}\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\, K_X^2}{\Omega^2}\right) K_Y\left(\frac{\mathrm{i}\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\, K_Y}{\gamma}+\frac{\mathrm{i}\,(1+n)\, Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right) K_X^2\, K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(\mathrm{i}\, Z\, K_X\left(\frac{\mathrm{i}\,\Omega^2\, K_X}{\gamma}+2\,\mathrm{i}\,\epsilon^2\,\Omega^2\, K_X+\frac{3}{4}\,\mathrm{i}\,\gamma\,\epsilon^4\,\Omega^2\, K_X-\mathrm{i}\, Z\,\epsilon^4\, K_X^3-\frac{\mathrm{i}\, Z^2\,\epsilon^4\, K_X^5}{\gamma\,\Omega^2}+\frac{\mathrm{i}\, Z\,\epsilon^2\, K_X\, K_Y^2}{\gamma}+\frac{1}{2}\,\mathrm{i}\, Z\,\epsilon^4\, K_X\, K_Y^2+\frac{\mathrm{i}\, Z^2\,\epsilon^4\, K_X^3\, K_Y^2}{\gamma\,\Omega^2}\right)\right)\Big/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\, K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\, K_X^2\right)}{1+n} - \frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right) K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\, K_X^2}{\Omega^2}\right)}{\gamma^2}\right) - \frac{\mathrm{i}\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\, K_X^2}{\Omega^2}\right) K_Y\left(\frac{\mathrm{i}\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\, K_Y}{\gamma}+\frac{\mathrm{i}\,(1+n)\, Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right) K_X^2\, K_Y}{\gamma}\right)}{\gamma}\right)\right)\Big/$$

$$\left(Z\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\, K_X^2-\frac{1}{2}\, Z\,\gamma\,\epsilon^4\,\Omega^2\, K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\, K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)^2\right)+$$

$$\left((1+n)\ \left(-\epsilon^2\,\Omega^2\,K_X^2 - \frac{1}{2}\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2 \right) \left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \right.\right.$$

$$\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\ \left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \right.$$

$$\left.\left. \frac{(1+n)\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\ \left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) -$$

$$\left.\left. \frac{i\ \left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)\,K_Y\ \left(\frac{i\ (1+n)\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)^2\,\Omega^2\,K_Y}{\gamma} + \frac{i\ (1+n)\ Z\,\epsilon^2\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,K_Y}{\gamma} \right)}{\gamma} \right) \right)$$

$$\left(-\left(\left(\left(Z\ \left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4 - Z\,\epsilon^2\,\Omega^2\,K_X^2 - \frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2 \right) \right.\right.\right.\right.$$

$$\left.\left.\left.\left. \left(1+\epsilon^2\ \left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2} \right) \right) \left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \right.\right.\right.\right.$$

$$\left.\left.\left.\left. \left(-\frac{\epsilon^2\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,K_X^2}{1+n} - \frac{(1+n)\ \epsilon^2\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^4}{\gamma^2\,\Omega^2} \right) + \right.\right.\right.\right.$$

$$\left.\left.\left.\left. \epsilon^2\,K_X^2\ \left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\ \left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \right.\right.\right.\right.$$

$$\left.\left.\left.\left. \frac{(1+n)\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\ \left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) + \right.\right.\right.\right.$$

$$\left.\left.\left.\left. \frac{(1+n)\ \epsilon^2\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\ \left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)\,K_Y^2}{\gamma^2} - \right.\right.\right.\right.$$

$$\left.\left.\left.\left. \frac{i\,\epsilon^2\,K_X^2\,K_Y\ \left(\frac{i\ (1+n)\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)^2\,\Omega^2\,K_Y}{\gamma} + \frac{i\ (1+n)\ Z\,\epsilon^2\ \left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,K_Y}{\gamma} \right)}{\gamma\,\Omega^2} \right) \right) \right) \Big/ \left((1+n) \right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^2\right)+\left(Z\,\epsilon^2\,K_X^2\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right)\Big/$$

$$\left((1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)-\left(Z\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.\right.$$

$$\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right) K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\imath}(1+n) Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(Z\left(-\epsilon^2\Omega^2 K_X^2-\frac{1}{2}\gamma\epsilon^4\Omega^2 K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z K_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/\Bigg((1+n)$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right) K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\imath}(1+n) Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2 K_Y}{\gamma}\right)}{\gamma}\right)\Bigg)+$$

$$\left(\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2 K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2 K_X^2\right)\right.$$

$$\left.\left(1+\epsilon^2\left(1+\frac{Z K_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/\Bigg((1+n)$$

$$\left(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\frac{\dot{\imath}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right) K_Y\left(\frac{\dot{\imath}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\imath}(1+n) Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right) K_X^2 K_Y}{\gamma}\right)}{\gamma}\right)\Bigg)+$$

$$\left(\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\,\gamma\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)-$$

$$\left(Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(i\,Z\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)K_Y\left(-\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}-\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)\right)\Big/\left((1+n)\right.$$

$$\left(\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \frac{(1+n)\,\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,\left(1 + \frac{3\,\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \frac{i\,\left(1 + \frac{\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)\,K_Y\,\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)^2\,\Omega^2\,K_Y}{\gamma} + \frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,K_Y}{\gamma} \right)}{\gamma} \right) +$$

$$\left(i\,Z\,K_X \left(\frac{i\,\Omega^2\,K_X}{\gamma} + 2\,i\,\epsilon^2\,\Omega^2\,K_X + \frac{3}{4}\,i\,\gamma\,\epsilon^4\,\Omega^2\,K_X - i\,Z\,\epsilon^4\,K_X^3 - \frac{i\,Z^2\,\epsilon^4\,K_X^5}{\gamma\,\Omega^2} + \frac{i\,Z\,\epsilon^2\,K_X\,K_Y^2}{\gamma} + \frac{1}{2}\,i\,Z\,\epsilon^4\,K_X\,K_Y^2 + \frac{i\,Z^2\,\epsilon^4\,K_X^3\,K_Y^2}{\gamma\,\Omega^2} \right) \right) \Big/$$

$$\left(\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \frac{(1+n)\,\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,\left(1 + \frac{3\,\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \frac{i\,\left(1 + \frac{\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)\,K_Y\,\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)^2\,\Omega^2\,K_Y}{\gamma} + \frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,K_Y}{\gamma} \right)}{\gamma} \right) \Big/$$

$$\left(Z\,\left(\Omega^4 + \gamma\,\epsilon^2\,\Omega^4 + \frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4 - Z\,\epsilon^2\,\Omega^2\,K_X^2 - \frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2 \right)^2 \left(1 + \epsilon^2\,\left(1 + \frac{Z\,K_X^2}{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2} \right) \right) \right) +$$

$$\left((1+n)\,\left(\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \frac{(1+n)\,\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,\left(1 + \frac{3\,\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \right.$$

$$\frac{\dot{\mathbb{1}}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{\dot{\mathbb{1}}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\dot{\mathbb{1}}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)$$

$$\Bigg(-\Bigg(\Bigg(Z\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z K_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg(\Bigg(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\Bigg)$$

$$\left(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2K_X^2}{1+n}-\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\Omega^2}\right)+$$

$$\epsilon^2K_X^2\Bigg(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)+$$

$$\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\frac{\dot{\mathbb{1}}\epsilon^2K_X^2K_Y\left(\frac{\dot{\mathbb{1}}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{\dot{\mathbb{1}}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma\Omega^2}\Bigg)\Bigg)\Bigg/\Bigg((1+n)$$

$$\Bigg(\Bigg(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\Bigg)\Bigg(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{\dot{\mathbb{1}}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{\dot{\mathbb{1}}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{\dot{\mathbb{1}}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)^2\Bigg)\Bigg)+$$

$$\left(Z\,\epsilon^2\,K_X^2\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right)\Big/$$

$$\left((1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\right.\right.$$

$$\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)-$$

$$\left(Z\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(Z\left(-\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\Big/\left((1+n)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\Bigg(\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{ZK_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Bigg/\Bigg((1+n)$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\Bigg(\left(\Omega^4+\gamma\epsilon^2\Omega^4+\frac{1}{4}\gamma^2\epsilon^4\Omega^4-Z\epsilon^2\Omega^2K_X^2-\frac{1}{2}Z\gamma\epsilon^4\Omega^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\gamma\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Bigg/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)-$$

$$\left(Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y^2\right)\Big/$$

$$\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(iZ\left(1+\epsilon^2\left(1+\frac{Z K_X^2}{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)K_Y\left(-\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}-\right.\right.$$

$$\left.\left.\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)\right)\Big/\Bigg((1+n)$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2 K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(iZK_X\left(\frac{i\Omega^2 K_X}{\gamma}+2i\epsilon^2\Omega^2 K_X+\frac{3}{4}i\gamma\epsilon^4\Omega^2 K_X-iZ\epsilon^4 K_X^3-\frac{iZ^2\epsilon^4 K_X^5}{\gamma\Omega^2}+\right.\right.$$

$$\left.\left.\frac{iZ\epsilon^2 K_X K_Y^2}{\gamma}+\frac{1}{2}iZ\epsilon^4 K_X K_Y^2+\frac{iZ^2\epsilon^4 K_X^3 K_Y^2}{\gamma\Omega^2}\right)\right)\Big/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\Bigg/$$

$$\left(Z^2\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\,K_X^2}{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)+$$

$$\left((1+n)\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)$$

$$\left(-1-\left(\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\,\gamma\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2}\right)\right)\right)\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\,K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+\right.$$

$$\epsilon^2\,K_X^2\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)+\right.$$

$$\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\left.\left.\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\right)\right)\Big/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^2+$$

$$\left(Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\,K_X^2}{1+n}-\frac{(1+n)\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^4}{\gamma^2\,\Omega^2}\right)+\right.$$

$$\epsilon^2\,K_X^2\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)+$$

$$\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\frac{i\epsilon^2K_X^2K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma\Omega^2}\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\Bigg(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{i\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{i(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{i(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)^2\Bigg)-$$

$$\Bigg(iZK_X\left(\frac{i\Omega^2K_X}{\gamma}+2i\epsilon^2\Omega^2K_X+\frac{3}{4}i\gamma\epsilon^4\Omega^2K_X-iZ\epsilon^4K_X^3-\frac{iZ^2\epsilon^4K_X^5}{\gamma\Omega^2}+$$

$$\frac{iZ\epsilon^2K_XK_Y^2}{\gamma}+\frac{1}{2}iZ\epsilon^4K_XK_Y^2+\frac{iZ^2\epsilon^4K_X^3K_Y^2}{\gamma\Omega^2}\Bigg)$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\Bigg(-\frac{\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2K_X^2}{1+n}-\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^4}{\gamma^2\Omega^2}\Bigg)+$$

$$\epsilon^2K_X^2\Bigg(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)+$$

$$\frac{(1+n)\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}-$$

$$\left.\left.\frac{i\,\epsilon^2\,K_X^2\,K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma\,\Omega^2}\right)\right)\Bigg/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\frac{i\,\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)\,K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)^2+$$

$$\left(\epsilon^2\left(\gamma-(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\right)\,K_X^2\left(\Omega^4+\gamma\,\epsilon^2\,\Omega^4+\frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4-Z\,\epsilon^2\,\Omega^2\,K_X^2-\right.\right.$$

$$\left.\left.\frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\right)\Bigg/\left(\left(1+n\right)\,\gamma\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right.$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\,\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)\,K_Y\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\,\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(\left(-\epsilon^2\,\Omega^2\,K_X^2-\frac{1}{2}\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2\right)\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\right)\,K_X^2}{(1+n)\,\gamma\,\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\,\Omega^2}\right)\right)\right)\Bigg/$$

$$\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.$$

$$\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-$$

$$\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)-$$

$$\left(Z\,\epsilon^2\left(1+\epsilon^2\right)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y^2\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)-$$

$$\left(\left(1+\epsilon^2\right)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y^2\right)\Big/$$

$$\left(\gamma\left(\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\,\epsilon^2}{2}\right)\Omega^2\right)+Z\,\epsilon^2\,K_X^2\right)}{1+n}-\right.\right.\right.$$

$$\left.\left.\left.\frac{(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\,\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)}{\gamma^2}\right)-\right.$$

$$\left.\left.\frac{i\left(1+\frac{\gamma\,\epsilon^2}{2}+\frac{Z\,\epsilon^2\,K_X^2}{\Omega^2}\right)K_Y\left(\frac{i\,(1+n)\left(1+\frac{\gamma\,\epsilon^2}{2}\right)^2\Omega^2\,K_Y}{\gamma}+\frac{i\,(1+n)\,Z\,\epsilon^2\left(1+\frac{\gamma\,\epsilon^2}{2}\right)K_X^2\,K_Y}{\gamma}\right)}{\gamma}\right)\right)+$$

$$\left(i\,Z\,K_X\left(-i\,\epsilon^4\,K_X^3-\frac{2\,i\,Z\,\epsilon^4\,K_X^5}{\gamma\,\Omega^2}+\frac{i\,\epsilon^2\,K_X\,K_Y^2}{\gamma}+\frac{1}{2}\,i\,\epsilon^4\,K_X\,K_Y^2+\frac{2\,i\,Z\,\epsilon^4\,K_X^3\,K_Y^2}{\gamma\,\Omega^2}\right)\right)\Big/$$

$$\left(\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \right.\right.$$

$$\left.\left. \frac{(1+n)\,\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,\left(1 + \frac{3\,\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \right.$$

$$\left. \frac{\mathbb{i}\,\left(1 + \frac{\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)\,K_Y\,\left(\frac{\mathbb{i}\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)^2\,\Omega^2\,K_Y}{\gamma} + \frac{\mathbb{i}\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,K_Y}{\gamma} \right)}{\gamma} \right) +$$

$$\left(\mathbb{i}\,K_X\,\left(\frac{\mathbb{i}\,\Omega^2\,K_X}{\gamma} + 2\,\mathbb{i}\,\epsilon^2\,\Omega^2\,K_X + \frac{3}{4}\,\mathbb{i}\,\gamma\,\epsilon^4\,\Omega^2\,K_X - \mathbb{i}\,Z\,\epsilon^4\,K_X^3 - \frac{\mathbb{i}\,Z^2\,\epsilon^4\,K_X^5}{\gamma\,\Omega^2} + \right.\right.$$

$$\left.\left. \frac{\mathbb{i}\,Z\,\epsilon^2\,K_X\,K_Y^2}{\gamma} + \frac{1}{2}\,\mathbb{i}\,Z\,\epsilon^4\,K_X\,K_Y^2 + \frac{\mathbb{i}\,Z^2\,\epsilon^4\,K_X^3\,K_Y^2}{\gamma\,\Omega^2} \right) \right) \Big/$$

$$\left(\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \right.\right.$$

$$\left.\left. \frac{(1+n)\,\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,\left(1 + \frac{3\,\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \right.$$

$$\left. \frac{\mathbb{i}\,\left(1 + \frac{\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)\,K_Y\,\left(\frac{\mathbb{i}\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)^2\,\Omega^2\,K_Y}{\gamma} + \frac{\mathbb{i}\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,K_Y}{\gamma} \right)}{\gamma} \right) +$$

$$\mathbb{i}\,K_Y\,\left(\left(\mathbb{i}\,Z\,\left(1+\epsilon^2 \right)\,\left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \right.\right.\right.$$

$$\left.\left.\left. \frac{(1+n)\,\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,\left(1 + \frac{3\,\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right)\,K_Y \right) \Big/$$

$$\left(\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \right.\right.$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{\mathbb{i}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{\mathbb{i}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{\mathbb{i}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)+$$

$$\Bigg(\Bigg(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\gamma\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\Bigg)\Bigg(-\frac{\mathbb{i}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}-$$

$$\frac{\mathbb{i}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\Bigg)\Bigg)\Big/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\Bigg(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{\mathbb{i}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{\mathbb{i}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{\mathbb{i}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)+$$

$$\Bigg(\mathbb{i}ZK_X\Bigg(-\frac{Z\epsilon^2K_X\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)K_Y}{1+n}+$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y}{\gamma^2}\Bigg)\Bigg)\Big/$$

$$\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\Bigg(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{\mathbb{i}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2 K_X^2}{\Omega^2}\right)K_Y\left(\frac{\mathbb{i}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2 K_Y}{\gamma}+\frac{\mathbb{i}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2 K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\mathbb{i}K_X\Bigg(\Bigg(\mathbb{i}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)$$

$$\left(1+\epsilon^2\left(1+\frac{Z\left(\gamma-(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\right)K_X^2}{(1+n)\gamma\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2}\right)\right)\Bigg)\Bigg/$$

$$\Bigg(\gamma\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{\mathbb{i}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{\mathbb{i}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{\mathbb{i}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(\mathbb{i}(1+n)Z\left(1+\epsilon^2\right)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2\right)\Bigg/$$

$$\Bigg(\gamma^2\Bigg(\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)\left(-\frac{\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)}{1+n}-$$

$$\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2\left(1+\frac{3\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)}{\gamma^2}\Bigg)-$$

$$\frac{\mathbb{i}\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y\left(\frac{\mathbb{i}(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)^2\Omega^2K_Y}{\gamma}+\frac{\mathbb{i}(1+n)Z\epsilon^2\left(1+\frac{\gamma\epsilon^2}{2}\right)K_X^2K_Y}{\gamma}\right)}{\gamma}\Bigg)\Bigg)+$$

$$\left(\mathbb{i}ZK_X\left(\frac{\left(-\left(\left(1+\frac{\gamma\epsilon^2}{2}\right)\Omega^2\right)+Z\epsilon^2K_X^2\right)^2}{1+n}-\frac{(1+n)\left(1+\frac{\gamma\epsilon^2}{2}\right)\left(1+\frac{\gamma\epsilon^2}{2}+\frac{Z\epsilon^2K_X^2}{\Omega^2}\right)K_Y^2}{\gamma^2}\right)\right)\Bigg/$$

$$\left(\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right) \left(-\frac{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2\,\left(-\left(\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2 \right) + Z\,\epsilon^2\,K_X^2 \right)}{1+n} - \frac{(1+n)\,\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,\left(1 + \frac{3\,\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)}{\gamma^2} \right) - \frac{i\,\left(1 + \frac{\gamma\,\epsilon^2}{2} + \frac{Z\,\epsilon^2\,K_X^2}{\Omega^2} \right)\,K_Y\,\left(\frac{i\,(1+n)\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)^2\,\Omega^2\,K_Y}{\gamma} + \frac{i\,(1+n)\,Z\,\epsilon^2\,\left(1+\frac{\gamma\,\epsilon^2}{2} \right)\,K_X^2\,K_Y}{\gamma} \right)}{\gamma} \right) \Big/$$

$$\left(Z\,\left(\Omega^4 + \gamma\,\epsilon^2\,\Omega^4 + \frac{1}{4}\,\gamma^2\,\epsilon^4\,\Omega^4 - Z\,\epsilon^2\,\Omega^2\,K_X^2 - \frac{1}{2}\,Z\,\gamma\,\epsilon^4\,\Omega^2\,K_X^2 \right) \left(1 + \epsilon^2\,\left(1 + \frac{Z\,K_X^2}{\left(1 + \frac{\gamma\,\epsilon^2}{2} \right)\,\Omega^2} \right) \right) \right)$$