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A solution of initial value problem for finding amplitude of every field component in arbitrary polarized light waves in totally reflected from self focusing kerr media, as function of dielectric function, is given by power series accurate to the 6th order.

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Negative kerr media' s dielectric function is

ϵ = ep + x, where x> 0, ep - dielectric constant, x - the term proportional to intensity, considered as independent variable

Square of amplitude of y component of the electric field is presented by power series accurate to the 6 th order :

h^2=h0 x + h1 x^2 + h2 x^3 + h3 x^4 + h4 x^5 + h5 x^6;

CoefficientList : {h0, h1, h2, h3, h4, h5} is found with elements expressed in the term of initial value, h0.

$$h1 = h0\left(\frac{1}{2\,ep} + \frac{2\,b0\,h0}{ep^{\wedge}3}\right);$$

$$h2 = h0\left(\frac{b0}{48\;b1\,ep^{\wedge}2} + h0\,\frac{-50\,b0^{\wedge}2 + 49\,b0\,ep}{48\,b1\,ep^{\wedge}4} + h0^{\wedge}2\,\frac{4\,b0^{\wedge}2}{ep^{\wedge}6}\right);$$

$$h3 = -\frac{1}{3\,ep^2}\,h0\left(\frac{-2\,b0^2 - 5\,b0\,ep}{384\,(b0-ep)^2\,ep} + \frac{(-1276\,b0^3 + 2440\,b0^2\,ep - 1157\,b0\,ep^2)\,h0}{384\,(b0-ep)^2\,ep^3} + \frac{(56\,b0^3 - 55\,b0^2\,ep)\,h0^2}{3\,(b0-ep)\,ep^5} - \frac{24\,b0^3\,h0^3}{ep^7}\right);$$

$$h4 = \frac{(156\,b0^3 - 332\,b0^2\,ep - 13\,b0\,ep^2)\,h0}{92160\,ep^4\,(-b0+ep)^3} + \frac{(104560\,b0^4 - 304360\,b0^3\,ep + 292162\,b0^2\,ep^2 - 92173\,b0\,ep^3)\,h0^2}{92160\,ep^6\,(-b0+ep)^3} + \frac{(199828\,b0^4 - 388964\,b0^3\,ep + 188317\,b0^2\,ep^2)\,h0^3}{23040\,ep^8\,(-b0+ep)^2} + \frac{(7486\,b0^4 - 7343\,b0^3\,ep)\,h0^4}{360\,ep^{10}\,(-b0+ep)} + \frac{16\,b0^4\,h0^5}{ep^{12}};$$

$$h5 = \frac{(1036\,b0^4 - 3540\,b0^3\,ep + 3983\,b0^2\,ep^2 - 786\,b0\,ep^3)\,h0}{921600\,ep^5\,(-b0+ep)^4} +$$

$$((3205904\, b0^5 - 12507352\, b0^4\, ep + 18193382\, b0^3\, ep^2 - 11656455\, b0^2\, ep^3 + 2762442\, b0\, ep^4)\, h0^2)/(2764800\, ep^7\, (-b0+ep)^4) + \frac{(7799564\, b0^5 - 22780884\, b0^4\, ep + 22055815\, b0^3\, ep^2 - 7065480\, b0^2\, ep^3)\, h0^3}{691200\, ep^9\, (-b0+ep)^3} + \frac{(1689740\, b0^5 - 3298016\, b0^4\, ep + 1602485\, b0^3\, ep^2)\, h0^4}{43200\, ep^{11}\, (-b0+ep)^2} + \frac{(8758\, b0^5 - 8579\, b0^4\, ep)\, h0^5}{150\, ep^{13}\, (-b0+ep)} + \frac{32\, b0^5\, h0^6}{ep^{15}};$$

CoefficientList in the power series of square of amplitude of x component of the electric field is

$$\{A0, A1, A2, A3, A4, A5\} = \Big\{\frac{(b0-ep)\,h0}{ep^2}, \frac{(-2\,b0+ep)\,h0}{2\,ep^3} + \frac{(2\,b0\,ep - 2\,ep^2)\,h1}{2\,ep^3}, \frac{(3\,b0-ep)\,h0}{3\,ep^4} + \frac{(-4\,b0\,ep+2\,ep^2)\,h1}{3\,ep^4} + \frac{(3\,b0\,ep^2 - 3\,ep^3)\,h2}{3\,ep^4}, \frac{(-4\,b0+ep)\,h0}{4\,ep^5} + \frac{(6\,b0\,ep - 2\,ep^2)\,h1}{4\,ep^5} + \frac{(-6\,b0\,ep^2+3\,ep^3)\,h2}{4\,ep^5} + \frac{(4\,b0\,ep^3 - 4\,ep^4)\,h3}{4\,ep^5}, \frac{(5\,b0-ep)\,h0}{5\,ep^6} + \frac{(-8\,b0\,ep+2\,ep^2)\,h1}{5\,ep^6} + \frac{(9\,b0\,ep^2-3\,ep^3)\,h2}{5\,ep^6} + \frac{(-8\,b0\,ep^3+4\,ep^4)\,h3}{5\,ep^6} + \frac{(5\,b0\,ep^4 - 5\,ep^5)\,h4}{5\,ep^6}, \frac{(-6\,b0+ep)\,h0}{6\,ep^7} + \frac{(10\,b0\,ep - 2\,ep^2)\,h1}{6\,ep^7} + \frac{(-12\,b0\,ep^2+3\,ep^3)\,h2}{6\,ep^7} + \frac{(12\,b0\,ep^3 - 4\,ep^4)\,h3}{6\,ep^7} + \frac{(-10\,b0\,ep^4+5\,ep^5)\,h4}{6\,ep^7} + \frac{(6\,b0\,ep^5 - 6\,ep^6)\,h5}{6\,ep^7}\Big\};$$

CoefficientList in the power series of square of amplitude of y component of the electric field is

$$\{e0, e1, e2, e3, e4, e5\} = 1 + \left(-\frac{b0}{ep^2} + \frac{-b0+ep}{ep^2}\right)h0, \left(\frac{3\,b0}{ep^3} - \frac{1}{2\,ep^2}\right)h0 + \left(-\frac{2\,b0}{ep^2} + \frac{1}{ep}\right)h1, \left(-\frac{4\,b0}{ep^4} + \frac{1}{3\,ep^3}\right)h0 + \left(\frac{10\,b0}{3\,ep^3} - \frac{2}{3\,ep^2}\right)h1 + \left(-\frac{2\,b0}{ep^2} + \frac{1}{ep}\right)h2, \left(\frac{5\,b0}{ep^5} - \frac{1}{4\,ep^4}\right)h0 + \left(-\frac{9\,b0}{2\,ep^4} + \frac{1}{2\,ep^3}\right)h1 + \left(\frac{7\,b0}{2\,ep^3} - \frac{3}{4\,ep^2}\right)h2 + \left(-\frac{2\,b0}{ep^2} + \frac{1}{ep}\right)h3, \left(-\frac{6\,b0}{ep^6} + \frac{1}{5\,ep^5}\right)h0 + \left(\frac{28\,b0}{5\,ep^5} - \frac{2}{5\,ep^4}\right)h1 + \left(-\frac{24\,b0}{5\,ep^4} + \frac{3}{5\,ep^3}\right)h2 + \left(\frac{18\,b0}{5\,ep^3} - \frac{4}{5\,ep^2}\right)h3 + \left(-\frac{2\,b0}{ep^2} + \frac{1}{ep}\right)h4, \left(\frac{7\,b0}{ep^7} - \frac{1}{6\,ep^6}\right)h0 + \left(-\frac{20\,b0}{3\,ep^6} + \frac{1}{3\,ep^5}\right)h1 + \left(\frac{6\,b0}{ep^5} - \frac{1}{2\,ep^4}\right)h2 + \left(-\frac{5\,b0}{ep^4} + \frac{2}{3\,ep^3}\right)h3 + \left(\frac{11\,b0}{3\,ep^3} - \frac{5}{6\,ep^2}\right)h4 + \left(-\frac{2\,b0}{ep^2} + \frac{1}{ep}\right)h5\};$$

CoefficientList in power series of square of amplitude of x component of the magnetic field is calculated through e0, e1, e2, e3, e4 and e5 .

Notation : b1 = b0 - ep;

$$\{b1\,e0, -e0 + 2\,b1\,e1, -2\,e1 + 3\,b1\,e2, -3\,e2 + 4\,b1\,e3, -4\,e3 + 5\,b1\,e4, -5\,e4 + 6\,b1\,e5\};$$

CoefficientList in the power series of square of amplitude of z component ofthe electric field is

$$\left\{\frac{b0\,h0}{ep^2}, \frac{-2\,b0\,h0 + b0\,ep\,h1}{ep^3}, \frac{3\,b0\,h0 - 2\,b0\,ep\,h1 + b0\,ep^2\,h2}{ep^4}, \frac{-4\,b0\,h0 + 3\,b0\,ep\,h1 - 2\,b0\,ep^2\,h2 + b0\,ep^3\,h3}{ep^5}, \frac{5\,b0\,h0 - 4\,b0\,ep\,h1 + 3\,b0\,ep^2\,h2 - 2\,b0\,ep^3\,h3 + b0\,ep^4\,h4}{ep^6}, \frac{-6\,b0\,h0 + 5\,b0\,ep\,h1 - 4\,b0\,ep^2\,h2 + 3\,b0\,ep^3\,h3 - 2\,b0\,ep^4\,h4 + b0\,ep^5\,h5}{ep^7}\right\};$$

CoefficientList in the power series of square of amplitude of z component of the magnetic field is equal to {e0, e1, e2, e3, e4, e5} multified by b0 :

{e0, e1, e2, e3, e4, e5} b0;

Any of coefficientLists is expressed in the term of initial value , h0, for the explicit defendence of :h1, h2, h3, h4 and h5 from h0