17/11/2009

Dear Sirs:

Using the equation (IX) for α3 of script of 1982 indicated down:

$$\alpha3(q,k) := \frac{e^{k-1}}{k} - q\cdot\left[\frac{\alpha}{3}\cdot\left(1+\sqrt{\eta\_(q,k)}\right)\cdot\left(\frac{\xi}{\eta\_(q,k)^2}\right)^{(2\cdot k+1)}\cdot\eta\_(q,k)^3 + \left(\frac{\eta\_(1,1)}{e\cdot\eta\_(q,k)}\right)\cdot(2\cdot\xi\cdot\eta\_(q,k))^k\cdot\left[\frac{\left(1-\sqrt{\eta\_(q,k)}\right)}{\left(1+\sqrt{\eta\_(q,k)}\right)}\right]^2\right]$$

With α given by:

$$A1 := \sqrt{\eta\_(1,1)}\cdot\frac{\left(1-\sqrt{\eta\_(1,1)}\right)}{\left(1+\sqrt{\eta\_(1,1)}\right)}$$

$$A2 := \sqrt{\eta\_(1,2)}\cdot\frac{\left(1-\sqrt{\eta\_(1,2)}\right)}{\left(1+\sqrt{\eta\_(1,2)}\right)}$$

$$D := 9\cdot\theta\cdot\frac{(1-A1\cdot A2)}{(2\cdot\pi)^5}$$

$$\alpha := \sqrt{\frac{-1+\sqrt{1-4\cdot D^2}}{-2}} \qquad \alpha = 7.297354597564723\times 10^{-3}$$

$$\frac{1}{\alpha} = 1.3703596099519688\times 10^{2}$$

The following values are obtained:

$k := 1$

$q := 0..k$

$N1(q,k) =$

$1\cdot 10^{0}$
$9.968812705531683\cdot 10^{-1}$

$N2(q,k) =$

$6.666666666666666\cdot 10^{-1}$
$6.750617425258186\cdot 10^{-1}$

$N3(q,k) =$

$2\cdot 10^{0}$
$1.9573175917804535\cdot 10^{0}$

$k := 2$

$q := 0..k$

$N1(q,k) =$

$1\cdot 10^{0}$
$9.962780882675572\cdot 10^{-1}$
$9.589182514626359\cdot 10^{-1}$

$N2(q,k) =$

$6.666666666666666\cdot 10^{-1}$
$6.767036958714698\cdot 10^{-1}$
$7.913672787769991\cdot 10^{-1}$

$N3(q,k) =$

$2.718281828459045\cdot 10^{0}$
$2.5988192179329896\cdot 10^{0}$
$2.007462491238667\cdot 10^{0}$

On the other hand using the equations of script of 1989? (4a)# and (8c)# we obtain:

$$\alpha p := \sqrt[6]{\eta}\cdot\frac{\left[1-\theta\cdot\left[\frac{2}{\eta}\cdot\frac{\left(1-\sqrt{\eta}\right)}{\left(1+\sqrt{\eta}\right)}\right]^{2}\cdot\sqrt{2\cdot\eta}\right]}{\eta^{2}} - 1$$

$$\alpha p = 1.832212396977306 \times 10^{-2}$$

$$\alpha n := -1 + \eta\cdot(1+\alpha p)$$

$$\alpha n = 8.128353747225425 \times 10^{-3}$$

$$N3(k,q) := \frac{2}{k}\cdot e^{(k-1)\cdot\left[1-\pi\cdot\frac{1-\eta\_(q,k)}{1+\sqrt{\eta\_(q,1)}}\cdot\left[1-u\cdot\frac{\eta\_(q,1)}{\theta\_(q,1)}\cdot\left(1-\frac{\alpha n}{\alpha p}\right)\cdot\left(1-\sqrt{\eta}\right)^{2}\right]\right]-\frac{\omega}{c\cdot u}\cdot\left(1-\sqrt{\eta}\right)^{2}\cdot\left[2\cdot\frac{c\cdot u^{2}}{\omega\cdot\theta}\cdot\frac{1+\sqrt{\eta\_(q,1)}}{(1-\eta)}-1\right]}$$

$k := 1$

$q := 0..k$

$N1(k,q) =$

$1\cdot10^{0}$
$9.968812705531683\cdot10^{-1}$

$N2(k,q) =$

$6.666666666666666\cdot10^{-1}$
$6.750617425258187\cdot10^{-1}$

$N3(k,q) =$

$1.9571855627151193\cdot10^{0}$
$1.9573176662909733\cdot10^{0}$

$N4(k,q) =$

$4\cdot10^{0}$
$4\cdot10^{0}$

$N5(k,q) =$

$1.157733756335647\cdot10^{0}$
$1.157733756335647\cdot10^{0}$

$N6(k,q) =$

$1.6444579190054325\cdot10^{-6}$
$1.6444579190054325\cdot10^{-6}$

$k := 2$

$q := 0..k$

$N1(k,q) =$

$1\cdot10^{0}$
$9.962780882675572\cdot10^{-1}$
$9.589182514626359\cdot10^{-1}$

$N2(k,q) =$

$6.666666666666666\cdot10^{-1}$
$6.767036958714699\cdot10^{-1}$
$7.913672787769991\cdot10^{-1}$

$N3(k,q) =$

$2.66009097502545\cdot10^{0}$
$2.5988192395716236\cdot10^{0}$
$2.0592841745803985\cdot10^{0}$

$N4(k,q) =$

$2\cdot10^{0}$
$4\cdot10^{0}$
$6\cdot10^{0}$

$N5(k,q) =$

$1.157733756335647\cdot10^{0}$
$1.73239192592923\cdot10^{0}$
$7.673188427276104\cdot10^{1}$

$N6(k,q) =$

$-1.0521531495463794\cdot10^{-1}$
$2.525567092143019\cdot10^{-2}$
$1.557266567974983\cdot10^{-1}$

As i mentioned before in another email, observing the second term of the equation (IX), we noticed that it appears multiplied by q. Now if we propose that there is a lost factor q in the second term within the exponential function of the equation (8c)# and correcting the same we obtain:

$$N3(k,q) := \frac{2}{k}\cdot e^{(k-1)\cdot\left[1-\pi\cdot\frac{1-\eta\_(q,k)}{1+\sqrt{\eta\_(q,1)}}\cdot\left[1-u\cdot\frac{\eta\_(q,1)}{\theta\_(q,1)}\cdot\left(1-\frac{\alpha n}{\alpha p}\right)\cdot\left(1-\sqrt{\eta}\right)^2\right]\right]-\frac{\omega}{c\cdot u}\cdot\left(1-\sqrt{\eta}\right)^2\cdot\left[2\cdot\frac{c\cdot u^2}{\omega\cdot\theta}\cdot\frac{1+\sqrt{\eta\_(q,1)}}{(1-\eta)}-1\right]\cdot q}$$

$k := 1$

$q := 0..k$

$N1(k,q) =$

$1\cdot10^{0}$
$9.968812705531683\cdot10^{-1}$

$N2(k,q) =$

$6.666666666666666\cdot10^{-1}$
$6.750617425258187\cdot10^{-1}$

$N3(k,q) =$

$2\cdot10^{0}$
$1.9573176662909733\cdot10^{0}$

$N4(k,q) =$

$4\cdot10^{0}$
$4\cdot10^{0}$

$N5(k,q) =$

$1.157733756335647\cdot10^{0}$
$1.157733756335647\cdot10^{0}$

$N6(k,q) =$

$1.6444579190054325\cdot10^{-6}$
$1.6444579190054325\cdot10^{-6}$

$k := 2$

$q := 0..k$

$N1(k,q) =$

$1\cdot10^{0}$
$9.962780882675572\cdot10^{-1}$
$9.589182514626359\cdot10^{-1}$

$N2(k,q) =$

$6.666666666666666\cdot10^{-1}$
$6.767036958714699\cdot10^{-1}$
$7.913672787769991\cdot10^{-1}$

$N3(k,q) =$

$2.718281828459045\cdot10^{0}$
$2.5988192395716236\cdot10^{0}$
$2.0167757114412734\cdot10^{0}$

$N4(k,q) =$

$2\cdot10^{0}$
$4\cdot10^{0}$
$6\cdot10^{0}$

$N5(k,q) =$

$1.157733756335647\cdot10^{0}$
$1.73239192592923\cdot10^{0}$
$7.673188427276104\cdot10^{1}$

$N6(k,q) =$

$-1.0521531495463794\cdot10^{-1}$
$2.525567092143019\cdot10^{-2}$
$1.557266567974983\cdot10^{-1}$

Then N3(1,0), N3(2,0) and N3(2,1) are corrected. Now appear the following questions:

It is possible that really that factor q is lost?
Must N3(2,2) =2.007… of 1982 be equal to N3(2,2) =2.016… of 1989?
It is possible that this difference is of some form included in the function $\varphi(p,\sigma)$?
The discrepancies in N5 and N6(2, q) must to other values of αp and αn?
These discrepancies, I do not believe, to be due to a lack of precision in the calculation program.

Best regards
Javier Mazzone