PhiFinePI.MCD

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The dimensionless fine structure constant has the value of: $\alpha := 7.297353080 \cdot 10^{-03}$

We start with two forms of the fine structure that deliver answers very close to the degrees in a radian.

$$\frac{\mathrm{asin}(\alpha)}{\alpha} = 5.7296288038 \times 10^{1}\,\mathrm{deg} \qquad \frac{\mathrm{atan}(\alpha)}{\alpha} = 5.7294762519 \times 10^{1}\,\mathrm{deg} \qquad 1)$$

$$\left[\frac{4\cdot\pi\cdot\left(\frac{\mathrm{asin}(\alpha)}{\alpha} - \frac{\mathrm{atan}(\alpha)}{\alpha}\right)}{\alpha}\right] = 2.6270121381 \times 10^{0}\,\mathrm{deg} \qquad 2)$$

Where, the Golden Ratio squared is stated as: $\left(\frac{4}{\pi}\right)^{4} = 2.6280914572 \times 10^{0}$ 3)

$$\left(\frac{4}{\pi}\right)^{4}\cdot\mathrm{deg} - \left[\frac{4\cdot\pi\cdot\left(\frac{\mathrm{asin}(\alpha)}{\alpha} - \frac{\mathrm{atan}(\alpha)}{\alpha}\right)}{\alpha}\right] = 1.0793190546 \times 10^{-3}\,\mathrm{deg} \qquad 4)$$

The two answers are very close.

Finally, the dimensionless fine structure constant is recoverd as:

$$\left[\frac{4\cdot\pi\cdot\left(\frac{\mathrm{asin}(\alpha)}{\alpha} - \frac{\mathrm{atan}(\alpha)}{\alpha}\right)}{\alpha}\right]\cdot\frac{1}{360\cdot\mathrm{deg}} = 7.2972559393 \times 10^{-3} \qquad \alpha = 7.29735308 \times 10^{-3} \qquad 5)$$

Note: The above equation (2) is simplified as:

$$\frac{4\cdot\pi\cdot\left(\frac{\mathrm{asin}(\alpha)}{\alpha} - \frac{\mathrm{atan}(\alpha)}{\alpha}\right)}{\alpha} \quad \text{simplifies to} \quad \frac{4\cdot\pi\cdot(\mathrm{asin}(\alpha) - \mathrm{atan}(\alpha))}{\alpha^{2}} = 2.6270121381 \times 10^{0}\,\mathrm{deg} \qquad 6)$$

It appears that the fine structure constant may be based on small differences of the asin and atan of itself which yields itself adinfinitum and further, the square of the Golden Ratio in degrees.

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