

## Fine Structure Constant . An Arithmetic Dissection .

Alberto Coe

[albamv8@gmail.com](mailto:albamv8@gmail.com)

### Abstract .

We analyze arithmetically the value of the fine structure constant .As we show , it's appropriate to write such constant using natural numbers only .On condition that such natural numbers are properly sorted . Namely , we make several simple series of natural numbers .Each series is a sum of different numbers . The second condition is to apply physical units .We use  $LT^{-1}$ , i.e. speed units .Since fine structure constant is a dimensionless number , we must to search the ratio between two speed values : speed of light in vacuum with respect to the sum of velocities expressed as a series of natural numbers added correctly .

**Keywords** . Fine structure constant , speed of light , natural numbers .

### Introduction .

Fine structure constant , or Sommerfeld constant ,  $\alpha$  (alpha) is a dimensionless number.Characterizes the strength of the coupling of an elementary charge with the electromagnetic field. The 2014 CODATA recommended value is

$$\alpha = 0.0072973525664(17)$$

### Method.

We use the sum of natural numbers .Such sum give us a series . Such series shows a peculiar symmetry .It's not arbitrary or whimsical option .It's worth to say that we have used this type of series in a numerical approximation to the number  $\pi$  , and other matters in the ground of the Physics .

### Results .

$$a = (1 + 2 + 16 + 32 + 16 + 2 + 1)10^6 = 70000000$$

$$b = (256 + 128 + 16 + 8)10 = 4080$$

$$d = (128 + 64 + 8 + 4)10 = 2040$$

$$e = (256 + 128 + 16 + 8) \frac{1}{10^3} = 0.408$$

We do the sum and assign speed units

$$F_{\dots} = \frac{1}{32}(a + b + d + e) = 2187691.26275 \frac{m}{s}$$

Speed of light in vacuum ,  $C = 299792458 \frac{m}{s}$  . Finally write the ratio

$$\frac{C}{F_{\dots}} = \frac{1}{\alpha} = 137.035999139 \dots \text{ agrees to the eleventh digit .}$$

