

ΑΣΚΗΣΗ – 7

Υποθέτουμε ότι  $f(1)=0.5, f(1.2)=0.9, [f(1.25)+f(1.75)]=a, f(1.5)=1.5, f(1.6)=1.65, f(1.95)=1.95$ , και  $f(2)=2$ . Να βρείτε την προσεγγιστική τιμή του  $a$ , αν ο σύνθετος κανόνας Simpson δίνει  $\int_1^2 f(x)dx=1.35$  [ΑΠΑΝΤΗΣΗ:  $a \approx 2.675$ ]

**Solution.** Since we need the equally spaced data points, so we can take  $x_0 = 1, x_1 = 1.25, x_2 = 1.5, x_3 = 1.75$  and  $x_4 = 2$ , gives  $n = 4$ , so  $h = \frac{2-1}{4} = 0.25$ . By using the composite formula (13) for  $n = 4$ , we have

$$\int_1^2 f(x) dx \approx \frac{0.25}{3} [f(1) + 4[f(1.25) + f(1.75)] + 2f(1.5) + f(2)].$$

Now using the given values, we obtain

$$1.35 \approx \frac{1}{12} [0.5 + 4(\alpha) + 2(1.5) + 2], \quad \text{or} \quad 12(1.35) - 5.5 \approx 4\alpha,$$

gives  $\alpha \approx 2.675$ .