

## Kaynaklar:

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## 6 aralıklı integral almak için Simpson 3/8 kuralının çoklu uygulaması

$$f(x) = 1 - x - 4x^3 + 2x^5$$

$$A = \int_{-2}^4 f(x) * dx \quad a = -2 \quad b = 4 \quad n = 6 \quad h = \frac{b-a}{n} = \frac{4-(-2)}{6} = 1$$

x	$f(x) = 1 - x - 4x^3 + 2x^5$
-2	-29
-1	4
0	1
1	-2
2	31
3	376
4	1789

### Simpson'nun 3/8 Kuralı.(Her seferinde 3 aralık)

$$I = \frac{3 \times h}{8} \times [f(x_0) + 3 \times f(x_1) + 3 \times f(x_2) + f(x_3)]$$

$$I = \frac{3 \times 1}{8} \times [-29 + 3 \times (4 + 1) - 2] + \frac{3 \times 1}{8} \times [-2 + 3 \times (31 + 376) + 1789] = 1122$$

$$\varepsilon_t = \left| \frac{(1122) - (1122)}{(1122)} \right| \times 100\% = 0\%$$

$x = x_i = 1.6$  'daki eşit olmayan aralıklı verilerin ilk türevi

x	1	1.5	1.6	2.5	3.5
f(x)	0.6767	0.3734	0.3261	0.08422	0.01596

$$f'(x) = f(x_{i-1}) \frac{2x - x_i - x_{i+1}}{(x_{i-1} - x_i)(x_{i-1} - x_{i+1})} + f(x_i) \frac{2x - x_{i-1} - x_{i+1}}{(x_i - x_{i-1})(x_i - x_{i+1})} + f(x_{i+1}) \frac{2x - x_{i-1} - x_i}{(x_{i+1} - x_{i-1})(x_{i+1} - x_i)}$$

$$f'(1.6) = 0.3734 \frac{2 \times 1.6 - 1.6 - 2.5}{(1.5 - 1.6)(1.5 - 2.5)} + 0.3261 \frac{2 \times 1.6 - 1.5 - 2.5}{(1.6 - 1.5)(1.6 - 2.5)} + 0.08422 \frac{2 \times 1.6 - 1.5 - 1.6}{(2.5 - 1.5)(2.5 - 1.6)}$$

$$f'(1.6) = -0.4526$$

$$\varepsilon_t = \left| \frac{(-0.4484) - (-0.4526)}{(-0.4484)} \right| \times 100\% = 0.9367\%$$

### Simpson'un 3/8 kuralı çoklu uygulamasıyla integral

$$d = \int_0^{\tau} v(t) dt$$

t	0	2	4	6	8	10	12
v(t)	0	16.4988	28.0425	36.1194	41.7705	45.7245	48.4910

$$I \simeq (b - a) \frac{f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3)}{8}$$

$$I \simeq (6 - 0) \frac{0 + 3 * 16.4988 + 3 * 28.0425 + 36.1194}{8}$$

$$+ (6 - 0) \frac{36.1194 + 3 * 41.7705 + 3 * 45.7245 + 48.4910}{8}$$

$$I \simeq 387.6290 \text{ m}$$

$$f'(x=0) =$$

?

$$f'(x=1.25) =$$

x	0	1.25	3.75
F(x)	13.25	12.50	10.75

$$f'(x) = f(x_{i-1}) \frac{2x - x_i - x_{i+1}}{(x_{i-1} - x_i)(x_{i-1} - x_{i+1})} + f(x_i) \frac{2x - x_{i-1} - x_i}{(x_i - x_{i-1})(x_i - x_{i+1})} + f(x_{i+1}) \frac{2x - x_{i-1} - x_i}{(x_{i+1} - x_{i-1})(x_{i+1} - x_i)}$$

$$f'(x=0) = 13.25 * \frac{2(0) - 1.25 - 3.75}{(0 - 1.25)(0 - 3.75)} + 12.50 * \frac{2(0) - 0 - 3.75}{(1.25 - 0)(1.25 - 3.75)} + 10.75 * \frac{2(0) - 0 - 1.25}{(3.75 - 0)(3.75 - 1.25)}$$

$$f'(x = 0) = -14.133 + 15 - 1.433 = -0.566$$

$$f'(x = 1.25) = 13.25 * \frac{2(1.25) - 1.25 - 3.75}{(0 - 1.25)(0 - 3.75)} + 12.50 * \frac{2(1.25) - 0 - 3.75}{(1.25 - 0)(1.25 - 3.75)} \\ + 10.75 * \frac{2(1.25) - 0 - 1.25}{(3.75 - 0)(3.75 - 1.25)}$$

$$f'(x = 1.25) = -7.066 + 5 + 1.433 = -0.633$$