

Срочное задание 20.001-му
Задание №1

Вариант №10

$$z(x) = \cos(2,8x + \sqrt{1+x}) \cdot \operatorname{arctg}(1,5x + 0,2)$$

$$x = 0,1(0,01)0,2$$

$$1) z = f(u, v) = uv$$

$$|\varepsilon| \leq \Delta z = \Delta f = B_1 \Delta u + B_2 \Delta v = B_u \Delta u + B_v \Delta v$$

$$B_u \Delta u = B_v \Delta v$$

$$\Delta u = \frac{\Delta z}{2B_u}; \quad \Delta v = \frac{\Delta z}{2B_v}$$

$$1.1) \frac{df}{du} = v$$

$$B_u = \max_{[0,1;0,2]} |v| = \max_{[0,1;0,2]} |\operatorname{arctg}(1,5x + 0,2)| =$$

$$= \operatorname{arctg}(1,5 \cdot 0,2 + 0,2) = \operatorname{arctg}(0,5) \approx$$

$$\approx 0,462117$$

$$1.2) \frac{df}{dv} = u$$

$$B_v = \max_{[0,1;0,2]} |u| = \max_{[0,1;0,2]} |\cos(2,8x + \sqrt{1+x})| =$$

$$= \cos(2,8 \cdot 0,1 + \sqrt{1,1}) \approx 0,999731$$

$$\Delta u = \frac{10^{-6}}{2 \cdot 0,462117}$$

$$\Delta v = \frac{10^{-6}}{2 \cdot 0,9999731}$$

$$2) u = \cos(\varphi)$$

$$\Delta u = \Delta u^* + B\varphi \Delta \varphi$$

$$B\varphi \Delta \varphi = \Delta \varphi \vee \varphi$$

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$$\Delta\varphi = \frac{\Delta u}{2B\varphi}, \quad \Delta u^* = \frac{\Delta u}{2} = \frac{10^{-6}}{4 \cdot 0,462117}$$

$$\frac{d\hat{\varphi}}{d\varphi} = -\sin(\varphi) \arctan(\varphi)$$

$$b\varphi = \max_{[0,1;0,2]} \left| -\sin(2,8x + \sqrt{1+x}) \cdot \arctg(1,5x) \right|$$

$$+0,2) / z = \sin(0,56 + \sqrt{1,2}) \cdot \arctg(0,5) \approx$$

$$\approx 0,013356$$

$$\Delta\varphi = \frac{10^{-6}}{10^{-6}}$$

$$\Delta\varphi = \frac{10^{-6}}{4 \cdot 1,1330,462117 \cdot 0,013350}$$