Lecture 4

Friday, January 13, 2023 8:14 AM

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Summation notation:

$$1+2+3+\cdots+100=\sum_{k=1}^{100} k$$

$$1^2+2^2+3^2+\cdots+100^2=\sum_{k=1}^{100} k^2$$

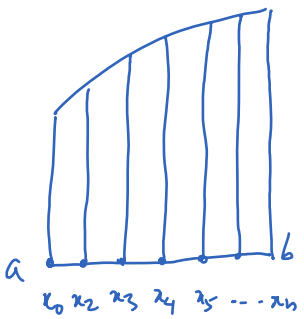
$$1+\frac{1}{2}+\frac{1}{2^2}+\frac{1}{2^3}+\cdots+\frac{1}{2^{100}}=\sum_{k=0}^{100}\frac{1}{2^k}$$

$$1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\cdots+\frac{1}{99}-\frac{1}{100}=\sum_{k=1}^{100}\frac{(-1)^{k+1}}{k}$$

$$\frac{1}{2}+\frac{2}{3}+\frac{3}{4}+\frac{4}{5}+\cdots+\frac{99}{100}=\sum_{k=1}^{99}\frac{k}{k+1}$$

$$2+4+6+\cdots+100=\sum_{k=1}^{100} 2k$$

$$1+3+5+\cdots+99=\sum_{k=0}^{49}(2k+1)=\sum_{k=1}^{50}(2k-1)=\sum_{i=1}^{50}(2i-1)$$



$$L_n=f(x_0)\Delta x+f(x_1)\Delta x+\cdots+f(x_{n-1})\Delta x=\sum_{k=0}^{n-1} f(x_k)\Delta x$$

$$R_n=f(x_1)\Delta x+f(x_2)\Delta x+\cdots+f(x_n)\Delta x=\sum_{k=1}^{n} f(x_k)\Delta x$$

$$M_n=f\left(\frac{x_0+x_1}{2}\right)\Delta x+f\left(\frac{x_1+x_2}{2}\right)\Delta x+\cdots+f\left(\frac{x_{n-1}+x_n}{2}\right)\Delta x=\sum_{k=0}^{n-1} f\left(\frac{x_k+x_{k+1}}{2}\right)\Delta x$$