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DE EVOLUTIONE
POTESTATIS POLYNOMIALIS
CUJUSCUNQUE

$$(1 + x + x^2 + x^3 + x^4 \text{ etc.})^n$$

Auctore

L. EULERO.

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§. 1.

Incipiamus a potestate binomiali $(1+x)^n$, qua more solito evoluta designemus coëfficientem potestatis cujusvis x^λ hoc charactere $\left(\frac{n}{\lambda}\right)$, ita ut sit

$$(1+x)^n = 1 + \left(\frac{n}{1}\right) x + \left(\frac{n}{2}\right) xx + \left(\frac{n}{3}\right) x^3 + \left(\frac{n}{4}\right) x^4 - \text{etc.} \ldots \left(\frac{n}{n}\right) x^n,$$

ubi ergo erit

$$\left(\frac{n}{1}\right) = n; \quad \left(\frac{n}{2}\right) = \frac{n(n-1)}{1.\ 2.}; \quad \left(\frac{n}{3}\right) = \frac{n.(n-1)(n-2)}{1.\ 2.\ 3.};$$

$$\left(\frac{n}{4}\right) = \frac{n.(n-1)(n-2)(n-3)}{1.\ 2.\ 3.\ 4.}$$

et in genere

$$\left(\frac{n}{\lambda}\right) = \frac{n.(n-1)(n-2)\ldots\ldots(n-\lambda+1)}{1.\ 2.\ 3.\ldots\ldots\ldots\ldots\lambda};$$

unde patet casu $\lambda = 0$ et $\lambda = n$ fore $\left(\frac{n}{0}\right) = \left(\frac{n}{n}\right) = 1$, atque adeo in genere $\left(\frac{n}{\lambda}\right) = \left(\frac{n}{n-\lambda}\right)$. Praeterea vero notasse juvabit, tam casibus quibus λ est numerus negativus, quam quibus est numerus

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