(Brouillon) Prima calculi magnitudinum elementa (LH 35, 4, 13, 5r-6v)

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Prima calculi magnitudinum elementa (LH 35, 4, 13, 1r-4v)

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Présentation

Editeur de la ficheÉquipe ERC Philiumm, SPHere ; EMAN, Thalim (CNRS-ENS-Sorbonne nouvelle)
Notice créée par Filippo Costantini Notice créée le 02/07/2024 Dernière modification le 05/08/2024

Prima Calculi Magnitudinum
Elementa demonstrata
in additione et subtractione
vel definitio

(1) Explicatio a b aut alia nota quaevis magnitudinem designant. Et magnitudo exprimitur per Numerum cujus unitati respondet mensura, quae magnitudinem constituit toties repetita quoties unitas in numero habetur.

(2) Definitio $a = b$ significat ipsam a aequalem esse b, seu ipsi a substitui posse b salva magnitudine. Talis propositio dicitur aequatio.

(3) Axioma $a = a$

(4) Theorema. Si $a = b$ vicissim esse $b = a$

~~Nam quia~~

Nam quia $a = b$ (ex hypothesi), ergo ~~(per def. 2)~~ substitui potest b substituatur per a (per 2) in aequatione $a = a$ priore ipsius a, (vera per axioma 3) fiet $b = a$ quod erat demonstrandum.

(5) Theorema. Si $a = b$ et $b = c$ erit $a = c$ vel ut vulgo enuntiant, quae sunt aequalia uni tertio, aequalia sunt inter se.

Nam quia $a = b$ (ex hypothesi priore) poterit in ea pro b substitui (per 2) aequale (ex hyp. posteriore) c, et ex $a = b$ fiet $a = c$.

Additio
(6) Definitio. Magnitudines a et b ut inde fiat una magnitudo m
$+a + b = m$ ~~additione~~ et $+$ vel plus

(7) Theorema $+a + b = +b + a$

$+a + b = +a + b$

(8) Postulatum

$a = +a$ et $a + b = +a + b$

$+ + a = +a$

$+ + a = +a$ (ex hyp.)

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(9) ~~Ax.~~ Theor. $a+0=a$ ...
0 est signum nihili quod nihil addit.

(10) Theor. Si aequalibus addas aequalia, fiunt aequalia. Seu: si sit $a=l$, et $b=m$ erit $a+b=l+m$

Nam $a+b=a+b$ (per 3) itaque in altera $a+b$ pro a ponendo l (ex hyp. priore) et pro b ponendo m (ex hyp. posteriore) quod licet (per 2) fiet utique ex $a+b=a+b$ fiet $a+b=l+m$ Q.E.D.

SUBTRACTIO

(11) ~~[illegible]~~ Theor.

$+a-a=0$ ... sive $-$ signum significans quod est subtractionis significat id quod positum fuit verbo tollendum, et quod ideo nihil efficit, et quod aliud ... perinde esse ac si factum non esset.

(12) Theor. Si ab aequalibus auferas aequalia, residua sunt aequalia. Seu: si sit $a=l$ et $b=m$ erit $a-b=l-m$

Nam $a-b=a-b$ (per 3) in posteriore pro a ponendo l (ex hyp. 1) et pro b ponendo m (ex hyp. 2) ergo ex $a-b=a-b$ fiet $a-b=l-m$ Q.E.D.

(13) Theor. Si a quantitatibus duabus auferas aequalia et residua fiant aequalia, ipsae quantitates sunt aequales. Seu: si ~~[illegible]~~ $b=m$ erit $a=l$ si $a-b=l-m$

Nam si aequalibus $a-b=$ (ex hyp.) $l-m$ addas aequalia (ex hyp. 2) b et m, nempe priori b, posteriori m fiet (per 10) aequalia $a-b+b=l-m+m$, id est (per 11) $a=l$ Q.E.D.

(14) Theor. Si ab aequalibus auferas duas quantitates et residua fiant aequalia, erunt quantitates aequales. Seu si sit quantitates aequales $a=l$, et $a-b=l-m$: erit $b=m$.

Nam $a-b=l-m$ (per hyp. 2) utrique addatur $b+m$ ... fiet (per 10) $a-b+b+m=l-m+b+m$

$a+m=l+b$ ... aequalia a et l (per hyp. 1) auferantur aequalibus si ~~[illegible]~~ fient (per 12) residua aequalia, $m=b$ Q.E.D.

(15) Theor. $a=b+c$ erit $a-b=c$

Nam ab utroque aequalium auferendo b fient aequalia $a-b=b+c-b$ id est (per 11) $a-b=c$ Q.E.D.

(16) ~~Theor. Si $a=-b$ erit $b=-c$~~

~~Nam $a=-b$ (ex hyp.)~~

(16) Theor. Si $a = -b$ erit $b = -a$

Nam quia $a = -b$ (ex hyp.) ergo addendo aequalibus aequalia b et b (per 3) fient (per 10) aequalia $a + b = -b + b$ ergo (per [illegible]) $a + b = 0$ [illegible] (per 11) $a = 0 - b$ [illegible] (per [illegible]) $a = -b$ [illegible]

(17) Theor. $-a - a = 0$

Nam $-a$ designetur per f. Sit $-a = f$ jam $f - f = 0$ (per [illegible]) Ergo pro f ponendo aequale ipsi (ex hyp.) $-a$ fiet $--a - a = 0$ q.e.d.

(18) Theor. $--a = a + a$

Nam $-a --a = 0$ (per 17) et $0 = -a + a$ (per 11) Ergo (per 5) $-a --a = -a + a$. Unde utrinque addendo a fient (per [illegible]) aequalia $+a -a --a = -a + a + a$ unde (per 11) [illegible] $0 --a = 0 + a$ [illegible] (per 9) $--a = +a$ q.e.d.

(18) Addenda [illegible] retentis [illegible] Sit f [illegible] addi debet $a-b$ fiet $f + a - b$

Sit $f - b = c$ ergo f [illegible] addi debet c [illegible] fiet $f + c$ (per 6) [illegible] (per 2) [illegible] $a-b$ [illegible] fiet $f + a - b$ q.e.d.

(19) [illegible] Subtrahenda [illegible] signis mutatis [illegible]

Sit f [illegible] demi debet $a-b$ [illegible] $f - \overline{a-b} = f + a + b$

Nam $f - \overline{a-b} = f - a - -b$ et [illegible]

(20) Explic. Quod de [illegible] formulis sub vinculo comprehensis significatur, intelligendum est de singulis membris vinculo inclusis. Ut $-(a-b)$ [illegible] vel $-\overline{a-b}$ significat $-a--b$

(21) Addenda ascribuntur [illegible] retentis signis $f + (a-b) = f + a - b$

Nam $f + (a-b) = f + a + -b$ [illegible] $f + a - b$

(19) Theor. $--a = -a$ [illegible] patet ex 9

(20) Theor. In omni aequatione licet membrum abscissum ab una parte, si quis contrario affectum ponere in altera.

Sit $f + a - b = h$. Dico fore $f = h - a + b$. Nam in aequatione (ex hypothesi vera) $f + a - b = h$ addatur utrinque $-a + b$ fiet inde $f + a - b - a + b = h - a + b$ et (per 11) $f = h - a + b$ q.e.d.

(22)

[illegible] subtrahenda ascribuntur signis mutatis, $+$ in $-$, et $-$ in $+$

[illegible] $f-(a-b) = f-a+b$.

Nam $f-(a-b) = $ (per 20) $f-a--b$ $=$ (per 18) $f-a+b$. Q.E.D.

[illegible]

(23) [illegible]

per [illegible] signo $+$ [illegible] quantitas positiva [illegible] signo $-$ [illegible] privativa [illegible]

(24) [illegible] $a+b = f$ [illegible] quantitates positivas [illegible] et a, b dicantur partes [illegible] ut $a+b+c = f$ [illegible]

(25) [illegible] Minus est aequale [illegible] majus [illegible] aequale est parti alterius [illegible] sit $f = a+b$ et $g = a$ [illegible] dicetur [illegible] f majus et g minus [illegible]

(26) Theor. Pars est minor toto, vel totum est majus sua parte.

Sit $a+b = f$ [illegible] quam f [illegible]

Nam [illegible] (per 25) [illegible] $a+b$ [illegible] aequale [illegible] a est [illegible] (per [illegible]) Ergo a est [illegible] quam f. Q.E.D.

(28) [illegible] $a\,p\,b$ [illegible] Nam [illegible] (hyp.) [illegible] $a+b$ [illegible] Q.E.D.

[illegible] Scholium [illegible] homogenea sunt aequalia, vel alterum [illegible] nec majus [illegible]

[illegible]

(27) [illegible] $= f-a+b$ Nam [illegible] (per 11) [illegible] $f-c$ et $f-a+b$ [illegible]

(27) [illegible] $a-b = c$ [illegible]

[illegible]

Subtrahatur [illegible] a [illegible] $a+c$ [illegible] $a = b+c$ [illegible]

(30) [illegible] $a+c = b+b$ [illegible] (per 30) [illegible] Q.E.D.