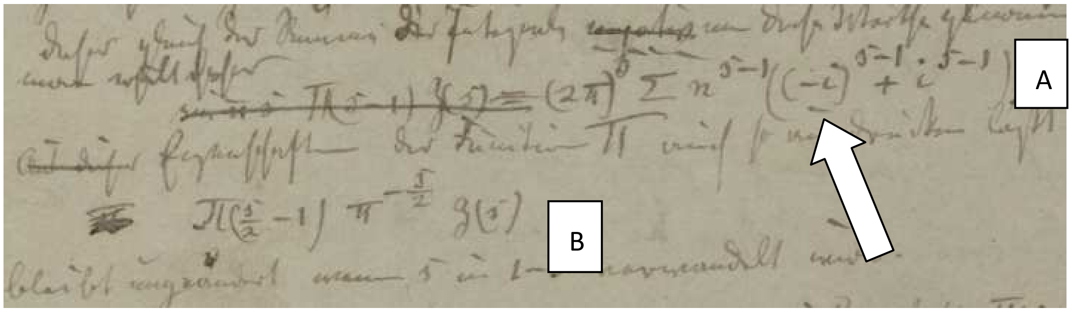
When Riemann wrote his equation in his papers, He wrote-off a part of the equation



In the equation No.(A) genius Riemann wants to tell us that there is something missing in this part therefore he canceled it with the pen .

In the equation No. (B) the genius Riemann wants to tell us when compensation S with 2S , the value of zeta(S) doesn't change, so zeta(S) equals to zeta(2S)

When we complete the equation No.1 with ($\cos\frac{\pi s}{2}$) , the equation is full.

$$\cos\frac{\pi s}{2}\sin\pi s\prod(s-1)\zeta(S) = 2^S\pi^S\sum n^{S-1}[(-i)^{S-1}+i^{S-1}]$$

$$2^{-S}\cos\frac{\pi s}{2}\ \sin\pi s\ \prod(s-1)\ \pi^{-S}\ \zeta(S) = \sum n^{S-1}\ [(-i)^{S-1}+\ i^{S-1}] \qquad \text{---(13)}$$

Riemann marked under $(-i)^{S-1}$ He wants to correct this part To become ((($-i^{S-1}$)))

S = 1,2,3,4,--------

$$\sum n^{S-1} = \sum\frac{1}{n^{1-s}}$$

$$\sum\frac{1}{n^{1-s}} = \zeta(1-S)$$

$$[-i^{S-1}+\ i^{S-1}] = 0$$

$$0 = \cos\frac{\pi s}{2}\ \cos\frac{\pi(1-s)}{2}$$

$$\cos\frac{\pi s}{2}\ \cos\frac{\pi(1-s)}{2} = \frac{1}{2}\sin\pi s$$

$$\prod\ (s-1) = \Gamma(S-1+1)$$

$$\Gamma(S-1+1) = \Gamma(S)$$

Compensation in the equation No:13

$$2^{-S}\ \cos\frac{\pi s}{2}\quad \sin\pi s\ \ \Gamma(S)\ \ \pi^{-S}\ \ \zeta(S) = \zeta(1-S)\frac{1}{2}\sin\pi s$$

$$2^{1-S}\ \cos\frac{\pi s}{2}\ \ \Gamma(S)\ \ \pi^{-S}\ \zeta(S) = \zeta(1-S)$$

$$\Gamma(S) = \frac{\pi}{\sin\pi s\ \ \Gamma(1-S)}$$

$$\frac{1}{2}\sin\pi S = \cos\frac{\pi\ (1-s)}{2}\quad \cos\frac{\pi\ S}{2}$$

$$\zeta(S) = 2^{S-1}\ \left[2\left(\cos\frac{\pi(1-S)}{2}\right)\ /\ \sin\pi S\right]\ \pi^{-1}\sin\pi s\ \Gamma(1-S)\ \ \pi^S\ \zeta(1-S)$$

$$\zeta(S) = 2^S\pi^{S-1}\left(\cos\frac{\pi(1-S)}{2}\right)\Gamma(1-S)\ \ \zeta(1-S)$$

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$$2^{-S}\ \cos\frac{\pi s}{2}\quad \sin\pi s\ \prod(s-1)\ \pi^{-S}\ \ \zeta(S) = \sum n^{S-1}\quad [-i^{S-1}+\ i^{S-1}]$$

$$2^{-S}\ \cos\frac{\pi s}{2}\quad \sin\pi s\ \prod(s-1)\ \pi^{-S}\ \ \zeta(S) = \zeta(1-S)\ \ \frac{1}{2}\ \sin\pi s$$

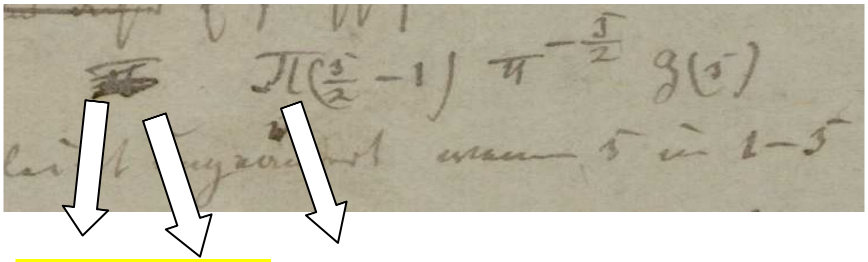
$$2^{-S}\cos\frac{\pi s}{2}\prod(s-1)\,\pi^{-S}\,\zeta(S) = \frac{1}{2}\zeta(1-S)$$

S = S/2

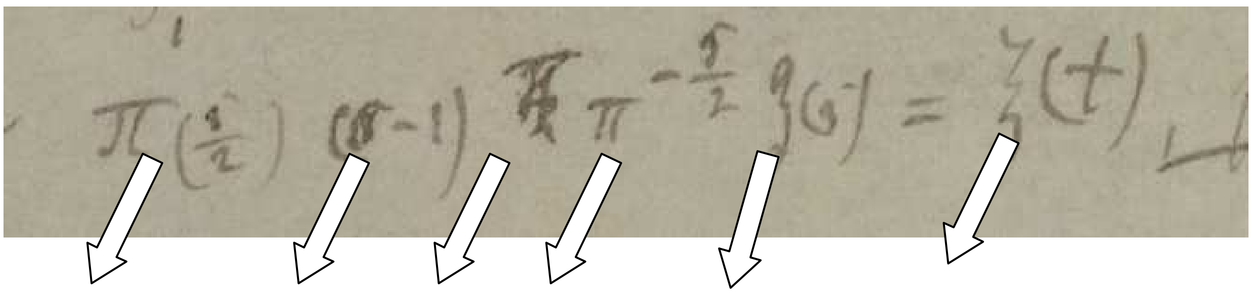
$$1/2^{\left(\frac{s}{2}\right)-1}\cos\frac{\pi\left(\frac{S}{2}\right)}{2}\prod\left(\frac{s}{2}-1\right)\pi^{-\left(\frac{S}{2}\right)}\zeta(S/2) = \zeta(1-S/2)$$

$* \zeta(S)$

$$1/2^{\left(\frac{s}{2}\right)-1}\cos\frac{\pi\left(\frac{S}{2}\right)}{2}\prod\left(\frac{s}{2}-1\right)\pi^{-\left(\frac{S}{2}\right)}\zeta(S/2)\,\zeta(S) = \zeta(1-S/2)\,\zeta(S)$$



$$1/2^{\left(\frac{s}{2}\right)-1}\cos\frac{\pi\left(\frac{S}{2}\right)}{2}\prod\left(\frac{s}{2}-1\right)\pi^{-\left(\frac{S}{2}\right)}\zeta(S) = \frac{\zeta(1-S/2)}{\zeta(S/2)}\zeta(S)$$



$$\prod\left(\frac{s}{2}\right)\ 1/2^{\left(\frac{s}{2}\right)-1}\cos\frac{\pi\left(\frac{S}{2}\right)}{2}\pi^{-\left(\frac{S}{2}\right)}\zeta(S) = \frac{\zeta(1-S/2)}{\zeta(S/2)\prod\left(\frac{s}{2}-1\right)}\zeta(S)\prod\left(\frac{s}{2}\right)$$

Compensation in the equation for the value S = 2s

$$\prod(s)\ 1/2^{s-1}\cos\frac{\pi s}{2}\pi^{-(s)}\zeta(2S) = \frac{\zeta(1-s)}{\zeta(s)\prod(s-1)}\zeta(2S)\prod(s)$$

$$1/2^{s-1}\cos\frac{\pi(s)}{2}\Gamma(s)\pi^{-(s)}\zeta(2S) = \frac{\zeta(1-S)}{\zeta(S)}\zeta(2S)$$

$$2^{1-s}\cos\frac{\pi s}{2}\Gamma(S)\,\pi^{-s}\,\zeta(S) = \zeta(1-S)$$

$$\Gamma(S) = \frac{\pi}{\sin\pi s\ \Gamma(1-S)}$$

$$\frac{1}{2}\sin\pi S = \cos\frac{\pi(1-s)}{2}\cos\frac{\pi S}{2}$$

$$\zeta(S) = \zeta(1-S)\,\pi^s 2^{s-1}\left(\cos\frac{\pi(1-s)}{2}\Big/\frac{1}{2}\sin\pi S\right)\pi^{-1}\sin\pi s\ \Gamma(1-S)$$

$$\zeta(S) = \zeta(1-S)\,\pi^s\,2^{s-1}\left(\cos\frac{\pi(1-s)}{2}\Big/\frac{1}{2}\right)\pi^{-1}\ \Gamma(1-S)$$

$$\zeta(S) = 2^S\pi^{S-1}\left(\cos\frac{\pi(1-S)}{2}\right)\Gamma(1-S)\,\zeta(1-S)$$

$$\zeta(S) = \zeta(1-S)$$

$$\zeta(S/2) = \zeta(1-S/2)$$

S	$\zeta(S/2)=\frac{1}{2}\sin\frac{\pi S}{2}$	$\zeta\left(1-\frac{S}{2}\right)=\frac{1}{2}\sin\pi\left(1-\frac{S}{2}\right)$
0,4,8,12,---	0	0
1,5,9,13,---	½	1/2
2,6,10,14,---	0	0
3,7,11,15,---	-1/2	-1/2