SIS 研究紀要 第 12 号 訂正部分

x^x (x の x 乗) について

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【例8】$z=-\frac{3}{4}$ のとき、

$$\left(-\frac{3}{4}\right)^{-\frac{3}{4}}=e^{-\frac{3}{4}\log\left(-\frac{3}{4}\right)}=\left(\frac{3}{4}\right)^{-\frac{3}{4}}\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right)=\frac{2\sqrt{2}}{\sqrt[4]{27}}\left(-\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}i\right)=\frac{2}{\sqrt[4]{27}}(-1+i)$$

$$\left(-\frac{3}{4}\right)^{-\frac{3}{4}}=e^{-\frac{3}{4}\log\left(-\frac{3}{4}\right)}=\left(\frac{3}{4}\right)^{-\frac{3}{4}}\left\{\cos\left(-\frac{3\pi}{4}\right)+i\sin\left(-\frac{3\pi}{4}\right)\right\}=\frac{2\sqrt{2}}{\sqrt[4]{27}}\left(-\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}}i\right)=\frac{2}{\sqrt[4]{27}}(-1-i)$$

$$\left(-\frac{3}{4}\right)^{-\frac{3}{4}}=e^{-\frac{3}{4}\log\left(-\frac{3}{4}\right)}=\left(\frac{3}{4}\right)^{-\frac{3}{4}}\left(\cos\frac{9\pi}{4}+i\sin\frac{9\pi}{4}\right)=\frac{2\sqrt{2}}{\sqrt[4]{27}}\left(\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}i\right)=\frac{2}{\sqrt[4]{27}}(1+i)$$

$$\left(-\frac{3}{4}\right)^{-\frac{3}{4}}=e^{-\frac{3}{4}\log\left(-\frac{3}{4}\right)}=\left(\frac{3}{4}\right)^{-\frac{3}{4}}\left\{\cos\left(-\frac{9\pi}{4}\right)+i\sin\left(-\frac{9\pi}{4}\right)\right\}=\frac{2\sqrt{2}}{\sqrt[4]{27}}\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}}i\right)=\frac{2}{\sqrt[4]{27}}(1-i)$$

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【例11】$z=-\pi$ のとき、z^z の値のひとつは②より、

$$\begin{aligned}(-\pi)^{-\pi}&=\pi^{-\pi}\left\{\cos\left(-\pi^2\right)+i\sin\left(-\pi^2\right)\right\}\\&\fallingdotseq-0.0247567717+0.0118013091i\end{aligned}$$

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【例13】

よって、 $(2+3i)^{2+3i}$ の値のひとつは、

$$\begin{aligned}(2+3i)^{2+3i}&=\exp\left\{2\log\sqrt{13}-3\tan^{-1}\frac{3}{2}+i\left(3\log\sqrt{13}+2\tan^{-1}\frac{3}{2}\right)\right\}\\&\fallingdotseq0.6075666647-0.3087560181i\end{aligned}$$