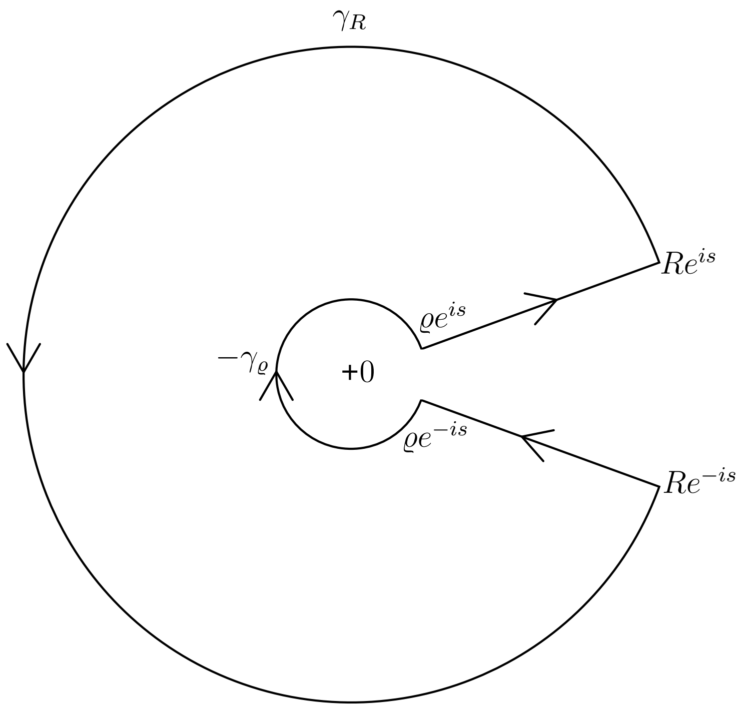

γ_R
Re^{is}
ϱe^{is}
$-\gamma_\varrho$
+0
ϱe^{-is}
Re^{-is}

$$ {}^{\infty}\underset{-}{\deg}\,\text{ɿ} < 0 \Rightarrow \sin(\pi a) \int_{dr/\pi}^{\mathbb{R}_+} \frac{{}^{r}\text{ɿ}}{r^{a}} = \operatorname{Res} \frac{{}^{z}\text{ɿ}}{(-z)^{a}} $$

$$ \overset{\geqslant}{\mathbb{C}}{}^{R}\,\overset{\circ}{\overline{z^{z}\text{ɿ}}} \leqslant M \Rightarrow \overline{\int_{dz/2\pi}^{\exp(\varepsilon i)\, R|\exp(-\varepsilon i)\, R} \frac{{}^{z}\text{ɿ}}{(-z)^{a}}} \leqslant R\frac{M}{R} R^{-a} = M\, R^{-a} \underset{a>0}{\rightsquigarrow} 0 $$

$$ \overset{\leqslant}{\mathbb{C}}{}^{\varrho}\,\overset{\circ}{\overline{{}^{z}\text{ɿ}}} \leqslant N \Rightarrow \overline{\int_{dz/2\pi}^{\exp(\varepsilon i)\, \varrho|\exp(-\varepsilon i)\, \varrho} \frac{{}^{z}\text{ɿ}}{(-z)^{a}}} \leqslant \varrho N \varrho^{-a} = N \varrho^{1-a} \underset{a<1}{\rightsquigarrow} 0 $$

$$ \begin{cases} z = \exp(is)\, r \\ 0 < s < 2\pi \end{cases} \Rightarrow \begin{cases} -z = \exp(i(s-\pi))\, r \\ -\pi < s-\pi < \pi \end{cases} \quad dz = \exp(is)\, dr $$

$$ \Rightarrow {}^{-z}\mathfrak{o} = {}^{r}\mathfrak{o} + i(s-\pi) \Rightarrow (-z)^{a} = \exp\left({}^{-z}\mathfrak{o}\right)^{a} = \exp\left({}^{r}\mathfrak{o} + i(s-\pi)\right)^{a} = \exp(a(s-\pi)\, i)\, r^{a} $$

$$ \Rightarrow \int_{dz}^{\exp(is)\,\varrho|\exp(is)\, R} \frac{{}^{z}\text{ɿ}}{(-z)^{a}} = \exp(is) \int_{dr}^{\varrho|R} \frac{{}^{\exp(is)\, r}\text{ɿ}}{(-\exp(is)\, r)^{a}} = {}^{s+(\pi-s)\,a}\mathfrak{e}^{i} \int_{dr}^{\varrho|R} \frac{{}^{\exp(is)\, r}\text{ɿ}}{r^{a}} \underset{s \nearrow 2\pi}{\overset{s \searrow 0}{\rightsquigarrow}} \int_{dr}^{\varrho|R} \frac{{}^{r}\text{ɿ}}{r^{a}} \begin{cases} {}^{\pi a}\mathfrak{e}^{i} \\ {}^{-\pi a}\mathfrak{e}^{i} \end{cases} $$

$$ \Rightarrow 2\pi i \operatorname{Res} \frac{{}^{z}\text{ɿ}}{(-z)^{a}} = \int_{dz} \frac{{}^{z}\text{ɿ}}{(-z)^{a}} \rightsquigarrow {}^{\pi a}\mathfrak{e}^{i} \int_{dr}^{\varrho|R} \frac{{}^{r}\text{ɿ}}{r^{a}} - {}^{-\pi a}\mathfrak{e}^{i} \int_{dr}^{\varrho|R} \frac{{}^{r}\text{ɿ}}{r^{a}} = \left({}^{\pi a}\mathfrak{e}^{i} - {}^{-\pi a}\mathfrak{e}^{i}\right) \int_{dr}^{\varrho|R} \frac{{}^{r}\text{ɿ}}{r^{a}} = 2i \sin(\pi a) \int_{dr}^{\varrho|R} \frac{{}^{r}\text{ɿ}}{r^{a}} $$

$$ \int_{dr/\pi}^{\mathbb{R}_+} \begin{cases} \dfrac{r^{a}}{1+r^{2}} = \dfrac{1}{2\cos(\pi a/2)} \\ \dfrac{r^{a-1}}{1+r} = \dfrac{1}{\sin(\pi a)} \\ \dfrac{r^{a-1}}{1+r^{b}} = \dfrac{1}{b\sin(\pi a/b)} \\ \dfrac{1}{1+r^{b}} = \dfrac{1}{b\sin(\pi/b)} \end{cases} $$

$$ \int_{dr/\pi}^{\mathbb{R}_+} \begin{cases} \dfrac{\sqrt{2}r^{1/3}}{r^{2}+4r+8} = \dfrac{\sin(\pi/12)}{\sin(\pi/3)} \\ \dfrac{r^{a}}{r^{2}+3r+2} \\ \dfrac{2\sqrt{r}}{r^{2}+2r+5} = \sqrt{\dfrac{\sqrt{5}-1}{2}} \end{cases} $$

$$\int_{dr}^{\mathbb{R}_+} \frac{r^a}{r^2 + 2r\cos\omega + 1} : -\pi < \omega < \pi : 0 < a < 1$$