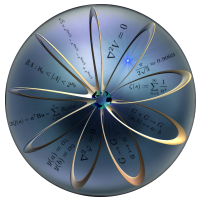

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integral represetations of Jacobi ϑ functions

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The Jacobi theta functions have the following integral representations:

$$\vartheta_1(z|\tau) = -e^{iz+i\pi\tau/4} \int_{i-\infty}^{i+\infty} \frac{e^{i\pi\tau u^2} \cos(2uz + \pi\tau u)}{\sin(\pi u)} du$$

$$\vartheta_2(z|\tau) = -ie^{iz+i\pi\tau/4} \int_{i-\infty}^{i+\infty} \frac{e^{i\pi\tau u^2} \cos(2uz + \pi u + \pi\tau u)}{\sin(\pi u)} du$$

$$\vartheta_3(z|\tau) = -i \int_{i-\infty}^{i+\infty} \frac{e^{i\pi\tau u^2} \cos(2uz + \pi u)}{\sin(\pi u)} du$$

$$\vartheta_4(z|\tau) = -i \int_{i-\infty}^{i+\infty} \frac{e^{i\pi\tau u^2} \cos(2uz)}{\sin(\pi u)} du$$