FORMULA 4.272.1

$$\int_0^1 \frac{\ln^{q-1}\left(1/x\right)\,dx}{1 + 2x\cos t + x^2} = \frac{\Gamma(q)}{\sin t} \sum_{k=1}^{\infty} \frac{(-1)^{k-1}}{k^q} \sin kt$$