the surface S and the μ-plane, x behaves in every region of the μ-plane like a rational function; (3) that y is likewise a rational function of μ; for the Riemann surface that represents x as a function of y is conformally related to S and hence to the μ-plane, and y behaves therefore in every region of the μ-plane like a rational function; (4) that μ is a rational function of λ; this can also be inferred easily from the conformal representation, but as it follows immediately from equations (1) and (4), we will not insist on this method.

Thus all of the statements of § 2 have been proven.

Example.
$$x=\frac{(\lambda^4+\lambda^{-4}+14)^3}{108\,(\lambda^4+\lambda^{-4}-2)^2}=\frac{4\,(\mu^2-\mu+1)^3}{27\,(\mu-1)^2}$$
$$y=-\left(\frac{\lambda^2-1}{2\lambda}\right)^2=\mu$$
$$\mu=-\tfrac{1}{4}\,(\lambda-\lambda^{-1})^2$$

See Klein-Fricke, *Modulfunctionen*, vol. I. p. 75, for the division of the λ-plane. The $\rho=4$ regions N, N', N'', N''' appear in the figure on p. 80. The notation λ, μ is there just the reverse of that in this paper.

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NOTES ON THE EXPRESSION FOR A VELOCITY-POTENTIAL IN TERMS OF FUNCTIONS OF LAPLACE AND BESSEL.

BY PROFESSOR JAMES MCMAHON.

1. *Differential equation for ψ.* The partial differential equation to be satisfied by a velocity-potential in an elastic fluid is, in rectangular coördinates,*

$$\frac{\partial^2\psi}{\partial x^2}+\frac{\partial^2\psi}{\partial y^2}+\frac{\partial^2\psi}{\partial z^2}=\frac{1}{a^2}\frac{\partial^2\psi}{\partial t^2}, \tag{1}$$

in which a^2 = pressure/ density, and $\psi\,(x, y, z, t)$ is a function whose derivatives as to x, y, z give the velocity-components of the fluid particle that occupies the position (x, y, z) at time t.

2. *Particular solution in polar coördinates.* When (1) is transformed to polar coördinates r, θ, φ, it can, as shown in

* RAYLEIGH, *Theory of Sound,* vol. II., p. 15.