But the second line of (35) is the residue at the pole of $1/\sin \pi (\zeta - t)$. Hence the sum of the four similar expressions

$$= - \text{residue at pole of } 1/\sin \pi (\zeta - t)$$

$$= \frac{\sin \pi \zeta}{\sin \pi (t - c) \ do. \ x, y, z}.$$  

Thus for the sum of the series in (33) we have

$$S = \frac{\pi \sin \pi \zeta}{\sin \pi (t - c) \ do. \ x, y, z} \times$$

$$\Pi (t + x + y + z - 2c)$$

$$\Pi (y + z - c) \Pi (x - c) \Pi (x + y - c) \Pi (t - x - c) \ do. \ y, z \ do. \ x, y, z,$$

where $R(t + x + y + z - 2c) > -1$.

To exhibit the result as the summation of a series of rational terms, multiply both sides of (36) by

$$\Pi (t + x + y + z - 2c)$$

Then

$$c + (c + 2) \frac{c - t}{t + 1} \ do. \ x, y, z, + \ldots + (c + 2n) \frac{(c - t)^{(n)}}{(t + 1)^{(n)}} \ do. \ x, y, z, + \ldots$$

$$+ (c - 2) \frac{t}{c - t - 1} \ do. \ x, y, z, + \ldots + (c - 2n) \frac{t^{(-n)}}{(c - t - 1)^{(-n)}} \ do. \ x, y, z, + \ldots$$

$$= \frac{\sin \pi \zeta}{\pi} \Pi (t + x + y + z - 2c) \Pi (y + z - c) \Pi (x + y - c) \Pi (t + y - c) \Pi (t + z - c)$$.  

(37)

For $t = 0$, this is equivalent to (9).

The result may be put in somewhat more striking form by writing $2a$ for $c$, and then $t + a, x + a, y + a, z + a$ for $t, x, y, z$.

Of special cases of (37), those obtained by writing $t = c/2, t = x, t = (c - 1)/2$ may be mentioned.

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By R. F. Muirhead, M.A., D.Sc.

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On Arithmetical Approximations.

By R. F. Davis, M.A.