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SOME DEFINITE INTEGRAL ASSOCIATED TO ERROR FUNCTION AND HYPERGEOMETRIC FUNCTION

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Abstract: In this paper we have developed some definite integral involving error function in association with Hypergeometric and first kind of Modified Bessel function.

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1. Introduction

Yurry A. Brychkov [Brychkov p. 188 (4.4.5.1, 4.4.5.2)] has derived the following formulae

$$\int_0^1 cos^{-1}x \ \mathrm{erf}(ax)\ dx = \frac{\sqrt{\pi}}{2a}\Big[-1+e^{\frac{-a^2}{2}}\Big\{(a^2+1)I_0\Big(\frac{a^2}{2}\Big)+a^2I_1\Big(\frac{a^2}{2}\Big)\Big\}\Big]. \quad (1.1)$$

$$\int_0^1 x^2\ cos^{-1}x \ \mathrm{erf}(ax)\ dx$$
$$= \frac{\sqrt{\pi}}{36a^3}\Big[(4a^4+3a^2+6)e^{\frac{-a^2}{2}}I_0\Big(\frac{a^2}{2}\Big)+a^2(4a^2-1)e^{\frac{a^2}{2}}I_1\Big(\frac{a^2}{2}\Big)-6\Big]. \quad (1.2)$$