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# SOLUTION OF ELECTRIC CIRCUIT PROBLEM IN H-FUNCTION OF TWO VARIABLES AND NUMERICAL ANALYSIS

By

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## ABSTRACT

In the present paper, we make an application of Fox's  $H$ -function in an electric circuit problem consisting of a resistance  $R$ , an inductance  $L$ , a condenser of capacity  $C$ , and a source of electromotive force  $E_0 p(t)$ , where  $E_0$  is constant and  $p(t)$  is known function of time  $t$ . The charge  $q(t)$  on the plates of condenser at any time  $t$  is obtained in the series involving  $H$ -function of two variables. Some interesting results through fractional calculus are also analysed.

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**1. Introduction and Preliminaries.** The generalized beta function is given by (see, Mathai, Saxena and Haubold [5])

$$\int_a^b (t-a)^{\alpha-1} (b-t)^{\beta-1} dt = (b-a)^{\alpha+\beta-1} B(\alpha, \beta) \quad (\operatorname{Re}(\alpha) > 0, \operatorname{Re}(\beta) > 0; a \neq b). \quad (1.1)$$

$$\text{and} \quad B(\alpha, \beta) = \frac{\Gamma(\alpha)\Gamma(\beta)}{\Gamma(\alpha+\beta)}. \quad (1.2)$$

We use the binomial functions in the form

$$(ut+v) = (au+v)^\gamma \sum_{l=0}^{\infty} \frac{(-\gamma)_l}{l!} \left\{ -\frac{(t-a)u}{au+v} \right\}^l \quad (1.3)$$

where, the pochhammer symbol is  $(\lambda)_u = \frac{\Gamma(\lambda+u)}{\Gamma(\lambda)}$ , (see, Rainville [9]).

The integral due to Prudnikov et.al. [7]

$$\int_a^b (t-a)^{\alpha-1} (b-t)^{\beta-1} (ut+v)^\gamma dt = (b-a)^{\alpha+\beta-1} (au+v)^\gamma B(a, b) {}_2F_1 \left[ \alpha-\gamma; \alpha+\beta; -\frac{(b-a)u}{au+v} \right] \quad (1.4)$$



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