
Hilfer-Katugampola

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f a b E E E
D_a u t f t u t D_a u t
a t b D_a u t

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${}^cD_a^p u t \quad f t u t \quad {}^cD_a^p u t$
u a u
a t b p ${}^cD_a^p$
f a b E E E E

$D_a u t \quad f t u t \quad D_a u t \quad t a b$
 $I_a u a \quad {}_i^m C_i u t$
u a b E $I_a D_a$
f a b E E E $t_i m a t t t_m b c E R$

1

E R
c R p $X_c^p a b$ ab f
f x_c^p
 $f_{x_c^p} \quad t^c f t \quad \frac{p dt}{t} \bar{p}$
1¹³ E uluR R
u t R u t
u R t R u t t t u t
u t t R u t t u t u t
u suppu t Rlu t
2¹⁴ r u r
u^r t Rut r urur
uu u E u r d u^r ur ur
3¹⁵ D u u
D u u sup H u^r u^r u u E
H u^r u^r u r u r u r u r u^r u^r D
E E u D u u u
D u u u u u E
4¹⁵⁻¹⁶ E

u u^r u^r u^r x xx u^rx u^r

ku^r ku^r kxx u^r r

u u u u u Ek k k R

u u u u u k k u ku ku ku u ku ku

D u u u u D u u á D u u D u u D, 2 u u í

$$D_a u t t \frac{d^n}{dt^n} I_a^n u t \frac{1}{n} t \frac{d^n}{dt^n} \frac{s}{a t s^n} u s ds$$

u L a b E

$$I_a u t \frac{1}{a t s} \frac{s}{t} u s ds t a$$

11¹² n n n N t a b u' t
u C a b E

$$D_a u t I_a s \frac{d}{ds} I_a u t I_a I_a u t$$

$$s \frac{d}{ds} u t I_a u t t a$$

2¹² u A C a b E d t a b u t I_a u t
a b d

$$I_a D_a u t u t \frac{C_i u t_i}{gH} t a$$

$$D_a I_a u t u t$$

3¹ Schauder B S B T S S
Tx x S B T x S Tx x
4¹ Banach B d T B B T B
Tx x

2

5 u E f a b E E

u t $\frac{m}{i} C_i u \ddot{t}$ t a $\frac{t}{a} \frac{s}{t s}$ f s u s D_a u s d s t ab

BC ab E ab E BC ab E
 C ab E B u r v ED v u r f ab E
 E E

z BC ab E t ab z f t z f t z BC ab E
 M t ab z ED f t z M
 g ab R L t ab z z E
 D f t z f t z g t D z z LD

1 $\frac{m}{i} C_i b a$ C ab E

F BC ab E BC ab E
 Fu t $\frac{m}{i} C_i u \ddot{t}$ t a $\frac{t}{a} \frac{s}{t s}$ f s u s D_a u s d s t ab

u u C ab E Fu t F
 C ab E
 B_r B r v BC ab E D_{ab} v r B_r BC F

$$\int_i^m C_i \frac{b}{a}$$

r

$$F B_r \quad B_r \quad F \quad B_r$$

F

u_n

$B_r u_n u$

t ab

$$D f s u_n s \quad D_a u_n s \quad f s u s \quad D_a u s \quad D f s u_n s \quad D_a u_n s \quad D f s u s \quad D_a u s \quad M$$

$$D \frac{t a}{a} \quad F u_n t \frac{t a}{a} \quad F u t$$

$$D \int_i^m C_i u_n t_i \frac{t a}{a} \quad \frac{t s}{a t s} f s u_n s \quad D_a u_n s \quad ds$$

$$\int_i^m C_i u t_i \frac{t a}{a} \quad \frac{t s}{a t s} f s u s \quad D_a u s \quad ds$$

$$\int_i^m C_i D u_n t_i u t_i \frac{t a}{a} \quad \frac{t s}{a t s} D$$

/

D

$$\frac{t^p a}{a} \frac{t^s}{t^p s} f su s D_a u s ds \quad \frac{t^p a}{t^p s} \frac{t^s}{t^p s} f su s D_a u s ds$$

$$D \frac{t a}{a} \frac{t^s}{t^p s} f su s D_a u s ds$$

$$\frac{t a}{a} \frac{t^s}{t^p s} f su s D_a u s ds$$

$$D \frac{t^a}{a} \frac{t^s}{t^p s} f su s D_a u s ds$$

$$\frac{m}{i} C_i D u \dot{t} v \dot{t} \quad \frac{t}{a} \quad \frac{t}{a} \frac{s}{s} D f s u s D_a u s f s v s D_a v s ds$$

$$\frac{m}{i} C_i D u \dot{t} v \dot{t} \quad \frac{t}{a} \quad \frac{b}{a} g t D u t v t \quad LD D_a u t D_a v t$$

$$\frac{m}{i} C_i D u \dot{t} v \dot{t} \quad \frac{t}{a} \quad \frac{b}{a} g t D u t v t \quad L \frac{g t}{L} D u t v t$$

$$\frac{m}{i} C_i \frac{b}{a} \quad \frac{G}{L} \frac{b}{a} D_{ab} uv$$

$$D_{ab} FuFv \quad k D_{ab} uv \quad k \quad F \quad F$$

$$u \quad ab$$

3

$$\bar{D} \bar{u} t t \quad t u t \quad - \bar{D} \bar{u} t t$$

$$\bar{I} \bar{u} \quad -u -$$

$$- \bar{D} \bar{u} t \quad f \quad uv E t$$

$$D f t u t \quad \bar{D} \bar{u} t f t v t \quad \bar{D} \bar{v} t$$

$$D t \quad t u t \quad - \bar{D} \bar{u} t t \quad t v t \quad - \bar{D} \bar{v} t$$

$$t D u t v t \quad - D \bar{D} \bar{u} t \bar{D} \bar{v} t$$

$$g t \quad t L - f \quad k$$

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Existence and Uniqueness of Solutions for Hilfer- Katugampola
Type Fuzzy Implicit Fractional Differential Equations

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