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NOMENCLATURE

A	constant with dimension $\frac{1}{s}$ and shows the amplitude
B_0	induced magnetic field;
g	acceleration due to gravity (m s^{-2});
u'	nanofluid velocity in x'-direction (m/s);
w'	nanofluid velocity in z'-direction (m/s);
m	Hall current parameter
Gr	Grashof number
k_f	the thermal conductivity of the base fluid ($Wm^{-1}K^{-1}$);
k_{nf}	the thermal conductivity of nanofluid ($Wm^{-1}K^{-1}$);
k_s	the thermal conductivity of nanoparticles ($Wm^{-1}K^{-1}$);
k^*	mean absorption coefficient;
μ_{nf}	dynamic viscosity of nanofluid (kg m^{-1} s^{-1});
q_{1r}	radiative heat flux (=W m^{-2});
T_1	fluid temperature (K);
β_f	the thermal expansion coefficient of base fluid (K^{-1});
β_{nf}	the thermal expansion coefficient of nanofluid (K^{-1});
β_s	the thermal expansion coefficient of nanoparticle (K^1);
Ω	rotation parameter;
μ_f	viscosity of base fluid (kg m^{-1} s^{-1});
ϕ	the solid volume fraction of the nanoparticle;
ρ_f	the density of the base fluid (kg m^{-3});
ρ_{nf}	the density of nanofluid (kg m^{-3});
$(\rho c_p)_f$	heat capacitance of base fluid;
$(\rho c_p)_{nf}$	heat capacitance of nanofluid;
$(\rho c_p)_s$	heat capacitance of nanoparticle;
σ^*	Stefan-Boltzmann constant ($=5.67\times10^{-8}$ W/m^2K^4);
σ_f	electrical conductivity of base fluid (=s^3 A^2 $m^{-3}kg^{-1}$);
σ_{nf}	electrical conductivity of nanofluid (=s^3 A^2 $m^{-3}kg^{-1}$);
σ_s	electrical conductivity of nanoparticle (=s^3 A^2 $m^{-3}kg^{-1}$).
ν_f	dynamic viscosity coefficient of base fluid;
β_1	Brinkman parameter;
η	rotation parameter;
M	magnetic parameter;
Gr	Grashof number;
Pr	Prandtl number;
Nr	radiation parameter;
η	Dimensionless rotation parameter;

APPENDIX

$$\overline{F_1}(y,s,H)=L^{-1}\left[\frac{1}{s^2}e^{-y\sqrt{H+s}}\right]=F_1(y,t,H)=\begin{bmatrix}e^{-y\sqrt{H}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}-\sqrt{Ht}\right)\left(\frac{t}{2}-\frac{y}{4\sqrt{H}}\right)\\+e^{y\sqrt{H}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}+\sqrt{Ht}\right)\left(\frac{t}{2}+\frac{y}{4\sqrt{H}}\right)\end{bmatrix}$$

$$\overline{F_2}(y,s,b,M)=L^{-1}\left[\frac{1}{s-b}e^{-y\sqrt{M+s}}\right]=F_2(y,t,b,M)=\frac{e^{bt}}{2}\begin{bmatrix}e^{-y\sqrt{M+b}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}-\sqrt{(b+M)t}\right)\\+e^{y\sqrt{M+b}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}+\sqrt{(b+M)t}\right)\end{bmatrix}$$

$$\overline{F_3}(y,s,M)=L^{-1}\left[\frac{1}{s}e^{-y\sqrt{M+s}}\right]=F_3(y,t,M)=\frac{1}{2}\begin{bmatrix}e^{-y\sqrt{M}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}-\sqrt{Mt}\right)\\+e^{y\sqrt{M+b}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}+\sqrt{Mt}\right)\end{bmatrix}$$

$$\overline{F_4}(y,s)=L^{-1}\left[\frac{1}{s^2}e^{-y\sqrt{s}}\right]=F_4(y,t)=\left[\left(t+\frac{y^2}{2}\right)\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}\right)-\frac{y\sqrt{t}}{\sqrt{\pi}}e^{\frac{y^2}{4t}}\right]$$

$$\overline{F_5}(y,s)=L^{-1}\left[\frac{1}{s}e^{-y\sqrt{s}}\right]=F_5(y,t)=\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}\right)$$

$$\overline{F_6}(y,s,b)=L^{-1}\left[\frac{1}{s-b}e^{-y\sqrt{s}}\right]=F_6(y,t,b)=\frac{e^{bt}}{2}\begin{bmatrix}e^{-y\sqrt{b}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}-\sqrt{bt}\right)\\+e^{y\sqrt{b}}\operatorname{erfc}\left(\frac{y}{2\sqrt{t}}+\sqrt{bt}\right)\end{bmatrix}$$