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REALIZATIONS OF INVOLUTIVE AUTOMORPHISMS σ AND G^{σ} OF EXCEPTIONAL LINEAR LIE GROUPS G, PART I, $G=G_2$. F_4 AND E_6

By

Ichiro YOKOTA

M. Berger [1] classified involutive automorphisms σ of simple Lie algebras $\mathfrak{g}$ and determined the type of the subalgebras $\mathfrak{g}^{\sigma}$ of fixed points. Now for connected exceptional universal linear Lie groups G, we shall find involutive automorphisms σ and realize the subgroups G^{σ} of fixed points explicitly. In this paper we consider the cases of type G_2, F_4 and E_6. Our results are as follows. (Results of E_7 will be soon appeared in this Journal).

G	G^{σ}	σ		
$G_2{}^C$	$(Sp(1, C)\times Sp(1, C))/\boldsymbol{Z}_2$	γ		
$G_2{}^C$	G_2	τ		
G_2	$(Sp(1)\times Sp(1))/\boldsymbol{Z}_2$	γ		
$G_2{}^C$	$G_{2(2)}$	$\tau\gamma$	$\tau\gamma c$	
$G_{2(2)}$	$(Sp(1)\times Sp(1))/\boldsymbol{Z}_2$	γ		
	$(Sp(1, \boldsymbol{R})\times Sp(1, \boldsymbol{R}))/\boldsymbol{Z}_2\times 2$		γ	
$F_4{}^C$	$(Sp(1, C)\times Sp(3, C))/\boldsymbol{Z}_2$	γ		
	$Spin(9, C)$	σ		
$F_4{}^C$	F_4	τ		
F_4	$(Sp(1)\times Sp(3))/\boldsymbol{Z}_2$	γ		
	$Spin(9)$	σ		
$F_4{}^C$	$F_{4(4)}$	$\tau\gamma$	$\tau\gamma c$	$\tau\gamma\sigma$
$F_{4(4)}$	$(Sp(1)\times Sp(3))/\boldsymbol{Z}_2$	γ		
	$(Sp(1, \boldsymbol{R})\times Sp(3, \boldsymbol{R}))/\boldsymbol{Z}_2\times 2$		γ	
	$(Sp(1)\times Sp(1, 2))/\boldsymbol{Z}_2$			γ
	$spin(4, 5)$	σ		
$F_4{}^C$	$F_{4(-20)}$	$\tau\sigma$	$\tau\sigma'$	
$F_{4(-20)}$	$(Sp(1)\times Sp(1, 2))/\boldsymbol{Z}_2$	γ		
	$Spin(9)$	σ		

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