CHARACTER TABLE FOR S_n POINT GROUP

Character table for S_4 point group

	E	S_4	C_2	$(S_4)^3$	Linear Functions, Rotations	Quadratic
A	1	1	1	1	R_z	x^2+y^2, z^2
B	1	-1	1	-1	z	x^2-y^2, xy
E	1	i	-1	-i	x+iy; R_x+iR_y	
	1	-i	-1	i	x-iy; R_x-iR_y	(xz, yz)

Character table for S_6 point group

	E	$C_3(z)$	$(C_3)^2$	i	$(S_6)^5$	S_6	Linear Functions, Rotations	Quadratic
$\mathbf{A_g}$	1	1	1	1	1	1	R_z	x^2+y^2, z^2
$\mathbf{E_g}$	1	e	e^*	1	e	e^*	R_x+iR_y	
	1	e^*	e	1	e^*	e	R_x-iR_y	(x^2-y^2, xy) (xz, yz)
$\mathbf{A_u}$	1	1	1	-1	-1	-1	z	
$\mathbf{E_u}$	1	e	e^*	-1	-e	$-e^*$	x+iy	
	1	e^*	e	-1	$-e^*$	-e	x-iy	

$e = \exp(2\pi i/3)$

Character table for S_8 point group

	E	S_8	C_4 (z)	$(S_8)^3$	C_2	$(S_8)^5$	$(C_4)^3$	$(S_8)^7$	Linear Functions, Rotations	Quadratic
A	1	1	1	1	1	1	1	1	R_z	x^2+y^2, z^2
B	1	-1	1	-1	1	-1	1	-1	z	
E_1	1	e	i	$-e^*$	-1	-e	-i	e^*	x+iy	
	1	e^*	-i	-e	-1	$-e^*$	i	e	x-iy	
E_2	1	i	-1	-i	1	i	-1	-i		
	1	-i	-1	i	1	-i	-1	i		(x^2-y^2, xy)
E_3	1	-e	i	e^*	-1	e	-i	$-e^*$	R_x+iR_y	
	1	$-e^*$	-i	e	-1	e^*	i	-e	R_x-iR_y	(xz, yz)

$e = \exp(\pi i/4)$