Character Tables
for some important symmetry groups

C_i	E	i		
A_g	1	1	$R_x; R_y; R_z$	$x^2; y^2; z^2; xy; xz; yz$
A_u	1	-1	$x; y; z$	

C_s	E	σ_h			
A'	1	1	$x; y$	R_z	$x^2; y^2; z^2; xy$
A''	1	-1	z	$R_x; R_y$	$xz; yz$

C_2	E	C_2^z			
A	1	1	z	R_z	$x^2; y^2; z^2; xy$
B	1	-1	$x; y$	$R_x; R_y$	$xz; yz$

C_{2v}	E	C_2^z	σ^{xz}	σ^{yz}			
A_1	1	1	1	1	z		$x^2; y^2; z^2$
A_2	1	1	-1	-1		R_z	xy
B_1	1	-1	1	-1	x	R_y	xz
B_2	1	-1	-1	1	y	R_x	yz

C_{3v}	E	$2C_3^z$	$3\sigma_v$			
A_1	1	1	1	z		$x^2 + y^2; z^2$
A_2	1	1	-1		R_z	
E	2	-1	0	(x, y)	(R_x, R_y)	$(xz, yz); ((x^2 - y^2), 2xy)$

C_{4v}	E	$2C_4$	C_4^2	$2\sigma_v$	$2\sigma_d$			
A_1	1	1	1	1	1	z		$x^2 + y^2; z^2$
A_2	1	1	1	-1	-1		R_z	
B_1	1	-1	1	1	-1			$(x^2 - y^2)$
B_2	1	-1	1	-1	1			xy
E	2	0	-2	0	0	(x, y)	(R_x, R_y)	(xz, yz)

Note: The σ_v planes in C_{4v} coincide with the xz and yz planes.

$\mathcal{C}_{2h}$	E	C_2^z	i	σ^{xy}		
A_g	1	1	1	1	R_z	$x^2; y^2; z^2; xy$
B_g	1	−1	1	−1	$R_x; R_y$	$xz; yz$
A_u	1	1	−1	−1	z	
B_u	1	−1	−1	1	$x; y$	

$\mathcal{D}_{2h}$	E	C_2^z	C_2^y	C_2^x	i	σ^{xy}	σ^{xz}	σ^{yz}		
A_g	1	1	1	1	1	1	1	1		$x^2; y^2; z^2$
B_{1g}	1	1	−1	−1	1	1	−1	−1	R_z	xy
B_{2g}	1	−1	1	−1	1	−1	1	−1	R_y	xz
B_{3g}	1	−1	−1	1	1	−1	−1	1	R_x	yz
A_u	1	1	1	1	−1	−1	−1	−1		
B_{1u}	1	1	−1	−1	−1	−1	1	1	z	
B_{2u}	1	−1	1	−1	−1	1	−1	1	y	
B_{3u}	1	−1	−1	1	−1	1	1	−1	x	

$\mathcal{D}_{3h}$	E	$2C_3$	$3C_2$	σ_h	$2S_3$	$3\sigma_v$			
A_1'	1	1	1	1	1	1			$x^2+y^2; z^2$
A_2'	1	1	−1	1	1	−1		R_z	
E'	2	−1	0	2	−1	0	(x, y)		$((x^2-y^2), 2xy)$
A_1''	1	1	1	−1	−1	−1			
A_2''	1	1	−1	−1	−1	1	z		
E''	2	−1	0	−2	1	0		(R_x, R_y)	(xz, yz)

$\mathcal{D}_{4h}$	E	$2C_4$	C_4^2	$2C_2$	$2C_2'$	i	$2S_4$	σ_h	$2\sigma_v$	$2\sigma_d$		
A_{1g}	1	1	1	1	1	1	1	1	1	1		$x^2+y^2; z^2$
A_{2g}	1	1	1	−1	−1	1	1	1	−1	−1	R_z	
B_{1g}	1	−1	1	1	−1	1	−1	1	1	−1		(x^2-y^2)
B_{2g}	1	−1	1	−1	1	1	−1	1	−1	1		xy
E_g	2	0	−2	0	0	2	0	−2	0	0	(R_x, R_y)	(xz, yz)
A_{1u}	1	1	1	1	1	−1	−1	−1	−1	−1		
A_{2u}	1	1	1	−1	−1	−1	−1	−1	1	1	z	
B_{1u}	1	−1	1	1	−1	−1	1	−1	−1	1		
B_{2u}	1	−1	1	−1	1	−1	1	−1	1	−1		
E_u	2	0	−2	0	0	−2	0	2	0	0	(x, y)	

Note: The C_2 axes in $\mathcal{D}_{4h}$ coincide with the x and y axes, and the σ_v planes with the xz and yz planes.

$\mathcal{D}_{6h}$	E	$2C_6$	$2C_6^2$	C_6^3	$3C_2$	$3C_2'$	i	$2S_3$	$2S_6$	σ_h	$3\sigma_d$	$3\sigma_v$		
A_{1g}	1	1	1	1	1	1	1	1	1	1	1	1		$x^2+y^2; z^2$
A_{2g}	1	1	1	1	−1	−1	1	1	1	1	−1	−1	R_z	
B_{1g}	1	−1	1	−1	1	−1	1	−1	1	−1	1	−1		
B_{2g}	1	−1	1	−1	−1	1	1	−1	1	−1	−1	1		
E_{1g}	2	1	−1	−2	0	0	2	1	−1	−2	0	0	(R_x, R_y)	(xz, yz)
E_{2g}	2	−1	−1	2	0	0	2	−1	−1	2	0	0		$((x^2-y^2), 2xy)$
A_{1u}	1	1	1	1	1	1	−1	−1	−1	−1	−1	−1		
A_{2u}	1	1	1	1	−1	−1	−1	−1	−1	−1	1	1	z	
B_{1u}	1	−1	1	−1	1	−1	−1	1	−1	1	−1	1		
B_{2u}	1	−1	1	−1	−1	1	−1	1	−1	1	1	−1		
E_{1u}	2	1	−1	−2	0	0	−2	−1	1	2	0	0	(x, y)	
E_{2u}	2	−1	−1	2	0	0	−2	1	1	−2	0	0		

$\mathcal{D}_{2d}$	E	$2S_4$	C_2^z	$2C_2'$	$2\sigma_d$			
A_1	1	1	1	1	1			$x^2+y^2; z^2$
A_2	1	1	1	−1	−1		R_z	
B_1	1	−1	1	1	−1			(x^2-y^2)
B_2	1	−1	1	−1	1	z		xy
E	2	0	−2	0	0	(x, y)	(R_x, R_y)	(xz, yz)

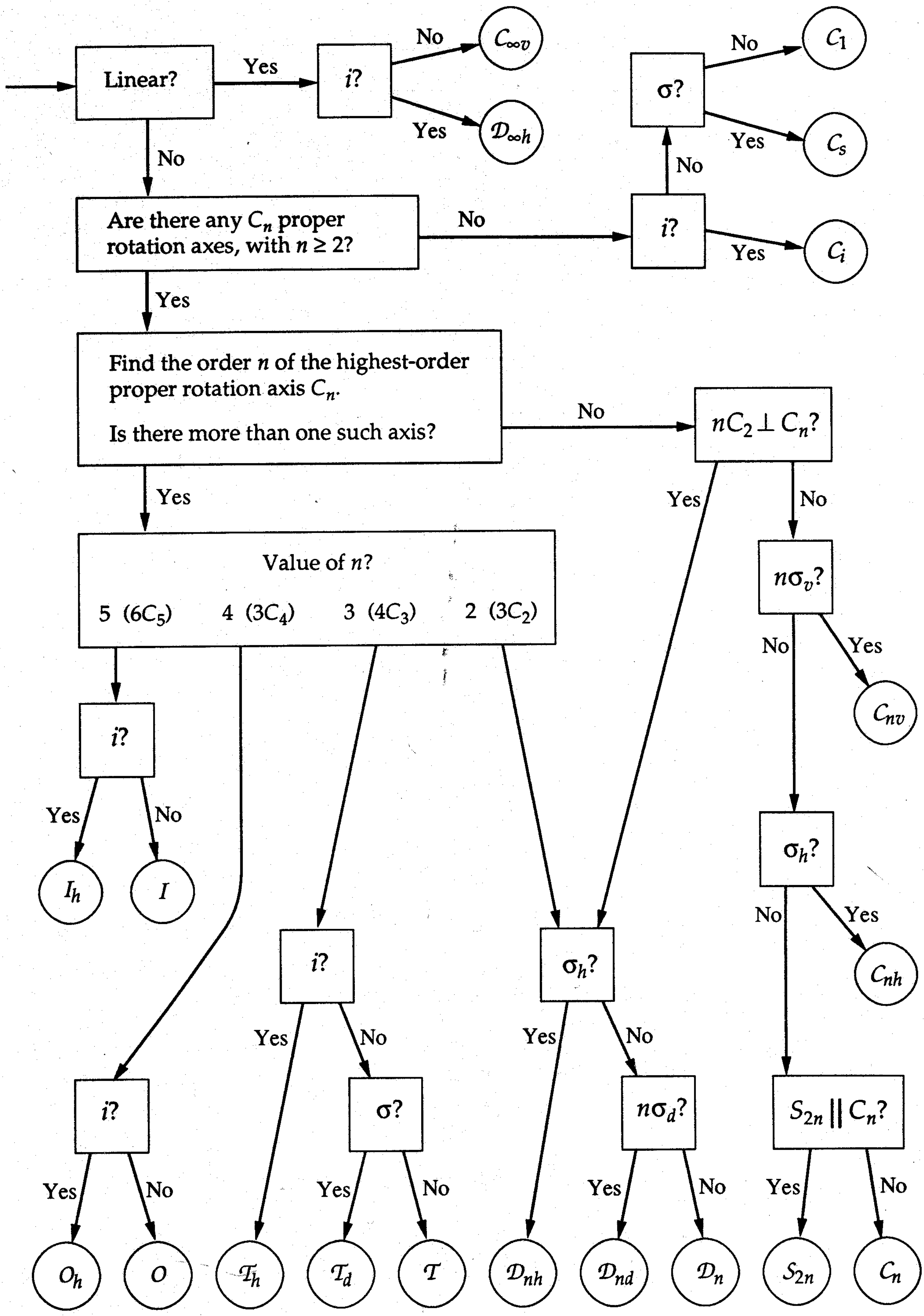
$\mathcal{D}_{3d}$	E	$2C_3$	$3C_2$	i	$2S_6$	$3\sigma_d$			
A_{1g}	1	1	1	1	1	1			$x^2+y^2; z^2$
A_{2g}	1	1	−1	1	1	−1		R_z	
E_g	2	−1	0	2	−1	0		(R_x, R_y)	$(xz, yz); ((x^2-y^2), 2xy)$
A_{1u}	1	1	1	−1	−1	−1			
A_{2u}	1	1	−1	−1	−1	1	z		
E_u	2	−1	0	−2	1	0	(x, y)		

$\mathcal{T}_d$	E	$8C_3$	$3C_2$	$6S_4$	$6\sigma_d$			
A_1	1	1	1	1	1			$x^2+y^2+z^2$
A_2	1	1	1	-1	-1			
E	2	-1	2	0	0			$((2z^2-x^2-y^2), \sqrt{3}(x^2-y^2))$
T_1	3	0	-1	1	-1		(R_x, R_y, R_z)	
T_2	3	0	-1	-1	1	(x, y, z)		(xz, xy, yz)

$\mathcal{O}_h$	E	$8C_3$	$3C_4^2$	$6C_4$	$6C_2$	i	$8S_6$	$3\sigma_h$	$6S_4$	$6\sigma_d$		
A_{1g}	1	1	1	1	1	1	1	1	1	1		$x^2+y^2+z^2$
A_{2g}	1	1	1	-1	-1	1	1	1	-1	-1		
E_g	2	-1	2	0	0	2	-1	2	0	0		$((2z^2-x^2-y^2), \sqrt{3}(x^2-y^2))$
T_{1g}	3	0	-1	1	-1	3	0	-1	1	-1	(R_x, R_y, R_z)	
T_{2g}	3	0	-1	-1	1	3	0	-1	-1	1		(xz, xy, yz)
A_{1u}	1	1	1	1	1	-1	-1	-1	-1	-1		
A_{2u}	1	1	1	-1	-1	-1	-1	-1	1	1		
E_u	2	-1	2	0	0	-2	1	-2	0	0		
T_{1u}	3	0	-1	1	-1	-3	0	1	-1	1	(x, y, z)	
T_{2u}	3	0	-1	-1	1	-3	0	1	1	-1		

$\mathcal{C}_{\infty v}$	E	$2C^z(\alpha)$	$\cdots$	$\infty\sigma_v$			
Σ^+ (A_1)	1	1	$\cdots$	1	z		$x^2+y^2; z^2$
Σ^- (A_2)	1	1	$\cdots$	-1		R_z	
Π (E_1)	2	$2\cos\alpha$	$\cdots$	0	(x, y)	(R_x, R_y)	(xz, yz)
Δ (E_2)	2	$2\cos 2\alpha$	$\cdots$	0			$((x^2-y^2), 2xy)$
Φ (E_3)	2	$2\cos 3\alpha$	$\cdots$	0			
$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$			

$\mathcal{D}_{\infty h}$	E	$2C^z(\alpha)$	$\cdots$	$\infty\sigma_v$	i	$2S^z(\alpha)$	$\cdots$	∞C_2		
Σ_g^+ (A_{1g})	1	1	$\cdots$	1	1	1	$\cdots$	1		$x^2+y^2; z^2$
Σ_g^- (A_{2g})	1	1	$\cdots$	-1	1	1	$\cdots$	-1	R_z	
Π_g (E_{1g})	2	$2\cos\alpha$	$\cdots$	0	2	$-2\cos\alpha$	$\cdots$	0	(R_x, R_y)	(xz, yz)
Δ_g (E_{2g})	2	$2\cos 2\alpha$	$\cdots$	0	2	$2\cos 2\alpha$	$\cdots$	0		$((x^2-y^2), 2xy)$
Φ_g (E_{3g})	2	$2\cos 3\alpha$	$\cdots$	0	2	$-2\cos 3\alpha$	$\cdots$	0		
$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$		
Σ_u^+ (A_{1u})	1	1	$\cdots$	1	-1	-1	$\cdots$	-1	z	
Σ_u^- (A_{2u})	1	1	$\cdots$	-1	-1	-1	$\cdots$	1		
Π_u (E_{1u})	2	$2\cos\alpha$	$\cdots$	0	-2	$2\cos\alpha$	$\cdots$	0	(x, y)	
Δ_u (E_{2u})	2	$2\cos 2\alpha$	$\cdots$	0	-2	$-2\cos 2\alpha$	$\cdots$	0		
Φ_u (E_{3u})	2	$2\cos 3\alpha$	$\cdots$	0	-2	$2\cos 3\alpha$	$\cdots$	0		
$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$		


Linear?
Yes
No
i?
No
Yes
$C_{\infty v}$
$D_{\infty h}$
σ?
No
Yes
C_1
C_s
Are there any C_n proper rotation axes, with $n \geq 2$?
No
i?
Yes
C_i
Yes
Find the order n of the highest-order proper rotation axis C_n.
Is there more than one such axis?
$nC_2 \perp C_n$?
Value of n?
5 ($6C_5$)
4 ($3C_4$)
3 ($4C_3$)
2 ($3C_2$)
$n\sigma_v$?
C_{nv}
σ_h?
C_{nh}
I_h
I
σ_h?
$n\sigma_d$?
$S_{2n} \parallel C_n$?
O_h
O
T_h
T_d
T
D_{nh}
D_{nd}
D_n
S_{2n}
C_n