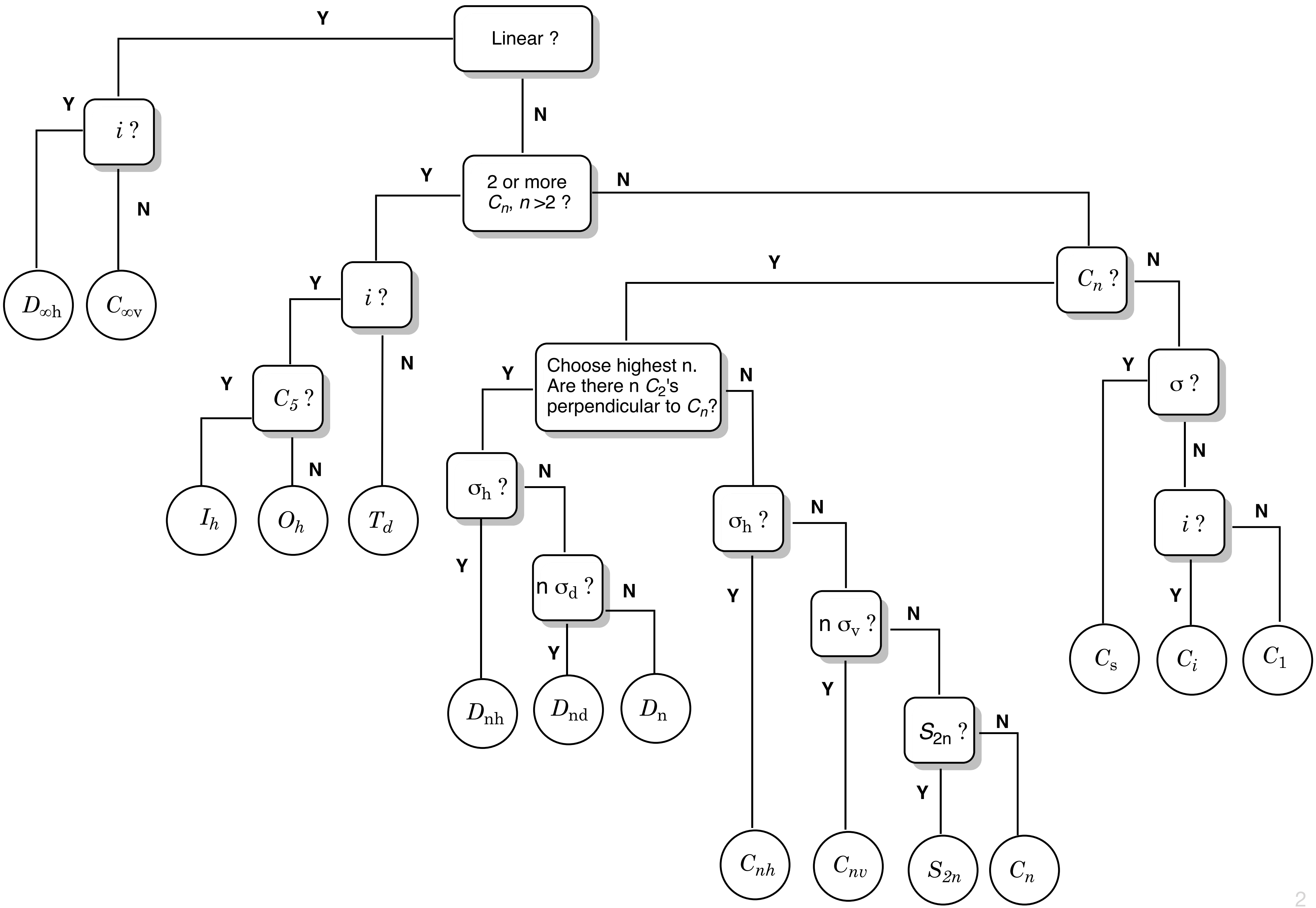
This Class

4.3 Properties and Representations of Groups

Next Class

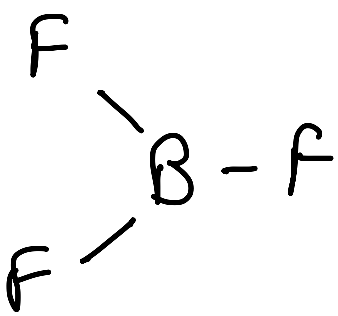
4.4 Examples

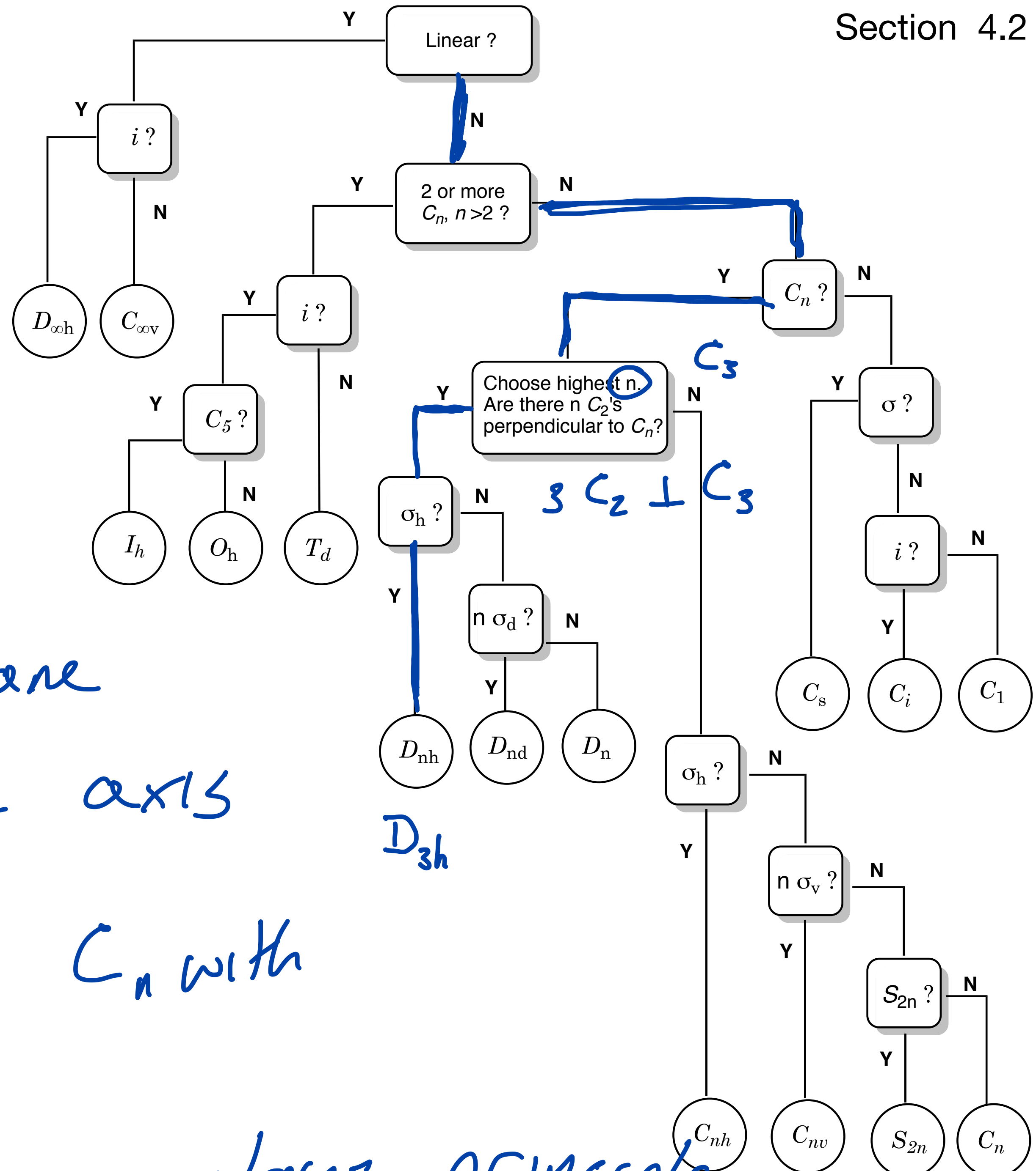
4.2


Linear ?
Y
N
i ?
$D_{\infty h}$
$C_{\infty v}$
2 or more C_n, $n > 2$?
i ?
C_5 ?
I_h
O_h
T_d
C_n ?
Choose highest n. Are there n C_2's perpendicular to C_n?
σ_h ?
n σ_d ?
D_{nh}
D_{nd}
D_n
σ_h ?
n σ_v ?
S_{2n} ?
C_{nh}
C_{nv}
S_{2n}
C_n
σ ?
i ?
C_s
C_i
C_1

Using the Tree

BF_3





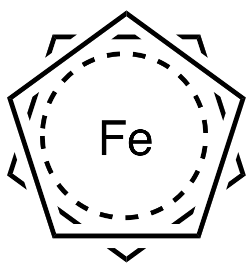
σ_h is a mirror plane $\perp$ to principle axis

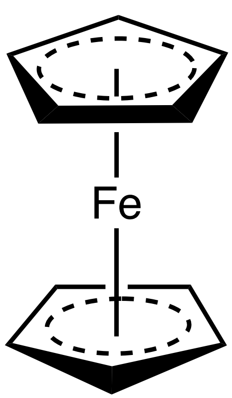
Principle axis is C_n with highest n

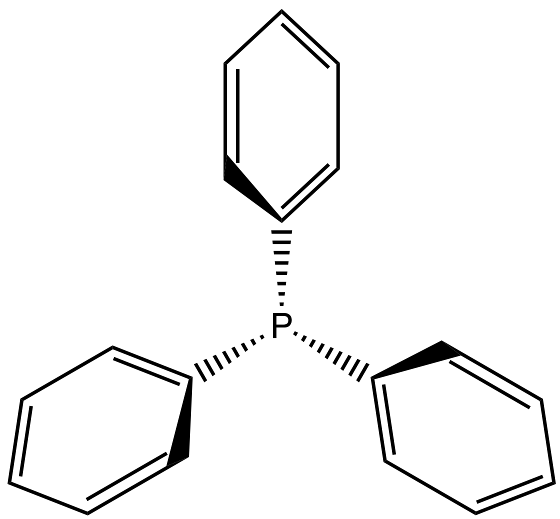
σ_v mirror plane than contains principle axis

Practice

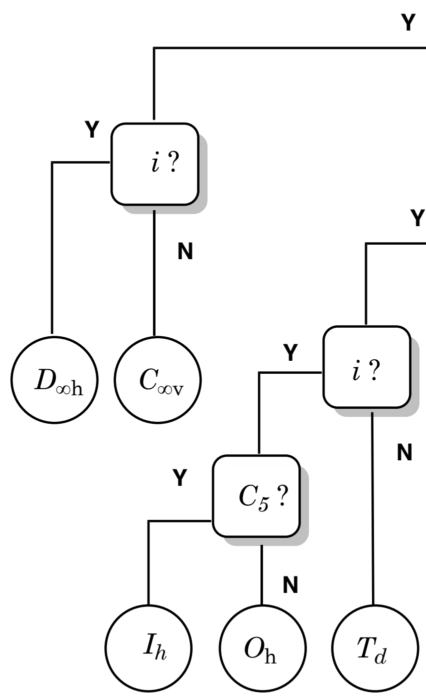
CH_2Cl_2	H_2O
PCl_3	BrF_5
HCN	PPh_3
$PtCl_4^{2-}$	(square planar)
Fc	
C_2H_2	

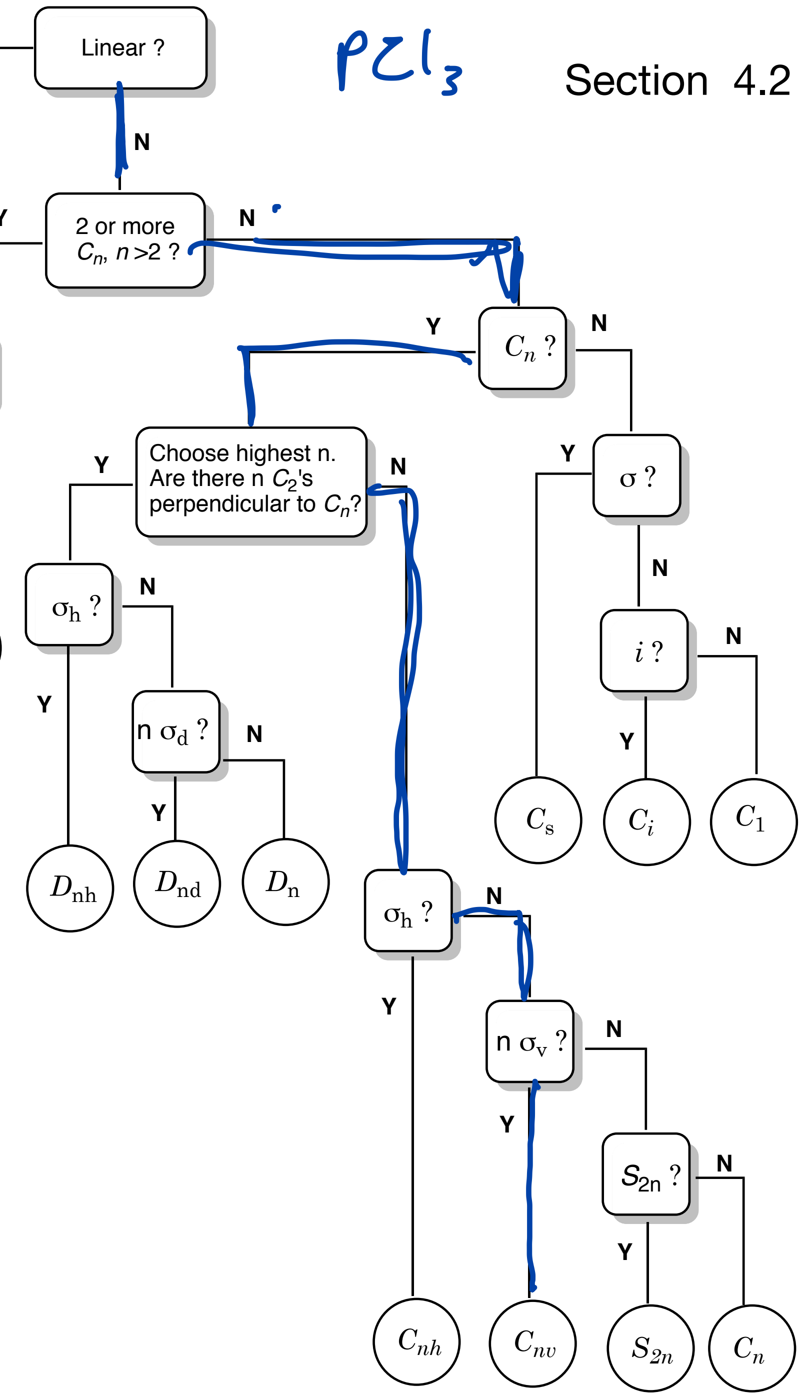






PCl_3





C_{3v}

CH_2Cl_2	C_{2v}	Fc	D_{5d}
PCl_3	C_{3v}	BrF_5	C_{4v}
HCN	$C_{\infty v}$	PPh_3	C_3
$PtCl_4^{2-}$	D_{4h}	H_2O	C_{2v}
C_2H_2	$D_{\infty h}$		

group

$\boxed{\text{integers} + \text{addition}}$

In mathematics, a group is a **set** combined with an **operation** that has the following properties

the operation combines any two elements of the set to form a third element which is part of the original set

other ways of saying this:

a set must be closed under the operation

there must be closure with respect to the operation

operating on elements of the set must satisfy the associative property

$4 + 0 = 4$

there must be an identity element in the set that when operated on by the operation along with any element of the set returns the original element

$4 + -4 = 0$

the operation in the set must be invertible (undoable) the set must contain elements such that the operation on two elements in the set produce the identity element

$4 \cdot 1 = 4$

$4 \cdot \frac{1}{4} = 1$

C_{2v}

E	C_2	$\sigma_v(xz)$	$\sigma_v(yz)$

This is

C_{2v}	E	C_2	$\sigma_v(xz)$	$\sigma_v(yz)$		
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

these are the characters

this is an irreducible representation