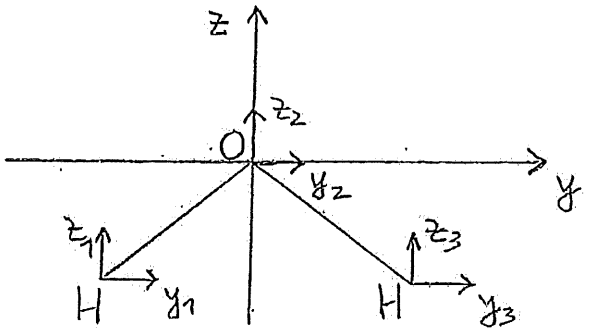
Beispiel H_2O:



Anwendung der Symmetrieoperation σ_v'
(Spiegelung an der yz-Ebene)

$$\sigma_v' \begin{pmatrix} x_1 \\ y_1 \\ z_1 \\ x_2 \\ y_2 \\ z_2 \\ x_3 \\ y_3 \\ z_3 \end{pmatrix} = \begin{pmatrix} -x_1 \\ +y_1 \\ z_1 \\ -x_2 \\ +y_2 \\ z_2 \\ -x_3 \\ +y_3 \\ z_3 \end{pmatrix} = \begin{pmatrix} -1 & & & & & & & & \\ & +1 & & & & & & & \\ & & 1 & & & & & & \\ & & & -1 & & & & & \\ & & & & +1 & & & & \\ & & & & & 1 & & & \\ & & & & & & -1 & & \\ & & & & & & & +1 & \\ & & & & & & & & 1 \end{pmatrix} \begin{pmatrix} x_1 \\ y_1 \\ z_1 \\ x_2 \\ y_2 \\ z_2 \\ x_3 \\ y_3 \\ z_3 \end{pmatrix}$$

$\chi_{disp}(\sigma_{yz}) = 3$

Spiegelung an der xz-Ebene (σ_v)

$$\sigma_v \begin{pmatrix} x_1 \\ y_1 \\ z_1 \\ x_2 \\ y_2 \\ z_2 \\ x_3 \\ y_3 \\ z_3 \end{pmatrix} = \begin{pmatrix} +x_3 \\ -y_3 \\ z_3 \\ +x_2 \\ -y_2 \\ z_2 \\ +x_1 \\ -y_1 \\ z_1 \end{pmatrix} = \left(\begin{array}{ccc|ccc|ccc} 0 & 0 & 0 & 0 & 0 & 0 & +1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ \hline 0 & 0 & 0 & +1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ \hline +1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right) \begin{pmatrix} x_1 \\ y_1 \\ z_1 \\ x_2 \\ y_2 \\ z_2 \\ x_3 \\ y_3 \\ z_3 \end{pmatrix}$$

$\chi_{disp}(\sigma_{xz}) = 1$

Drehung um C_2-Achse

$$C_2 \begin{pmatrix} x_1 \\ y_1 \\ z_1 \\ x_2 \\ y_2 \\ z_2 \\ x_3 \\ y_3 \\ z_3 \end{pmatrix} = \begin{pmatrix} -x_3 \\ -y_3 \\ z_3 \\ -x_2 \\ -y_2 \\ z_2 \\ -x_1 \\ -y_1 \\ z_1 \end{pmatrix} = \left(\begin{array}{ccc|ccc|ccc} & & & & & & -1 & 0 & 0 \\ & \sigma & & & \sigma & & 0 & -1 & 0 \\ & & & & & & 0 & 0 & 1 \\ \hline & & & -1 & 0 & 0 & & & \\ & \sigma & & 0 & -1 & 0 & & \sigma & \\ & & & 0 & 0 & 1 & & & \\ \hline -1 & 0 & 0 & & & & & & \\ 0 & -1 & 0 & & \sigma & & & \sigma & \\ 0 & 0 & 1 & & & & & & \end{array}\right) \begin{pmatrix} x_1 \\ y_1 \\ z_1 \\ x_2 \\ y_2 \\ z_2 \\ x_3 \\ y_3 \\ z_3 \end{pmatrix}$$

$$\chi_{disp}(C_2) = -1$$

Charaktere der reduziblen DS und Charaktertafel:

C_{2v}	E	C_2	σ_{xz}	σ_{yz}	Bsp.
A_1	1	1	1	1	T_z/z
A_2	1	1	-1	-1	R_z
B_1	1	-1	1	-1	T_x/x, R_y
B_2	1	-1	-1	1	T_y/y, R_x
Γ_{disp}	9	-1	1	3	