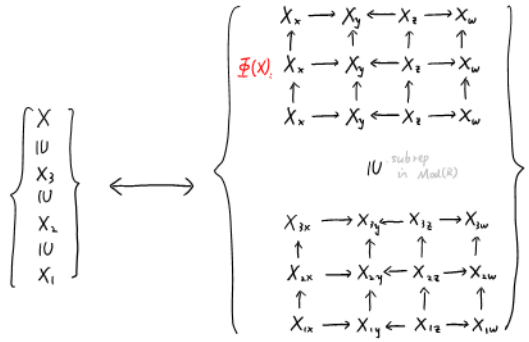
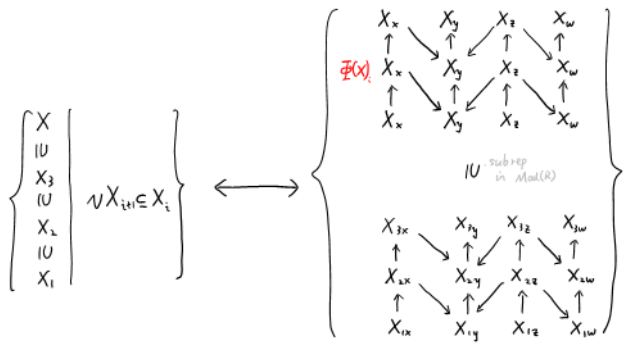


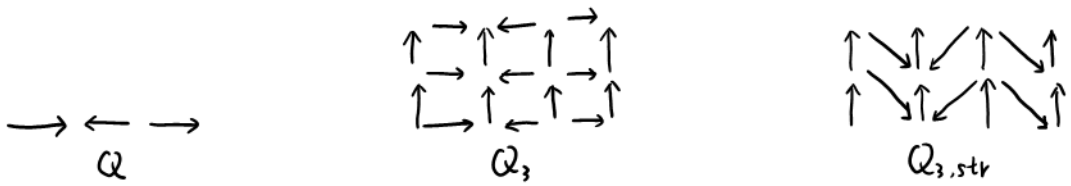
$\Phi(X)$: $X_x \to X_y \leftarrow X_z \to X_w$ (subrep in $Mod(R)$)

$\mathrm{Flag}_3(X) \longleftrightarrow \mathrm{Gr}(\Phi(X))$



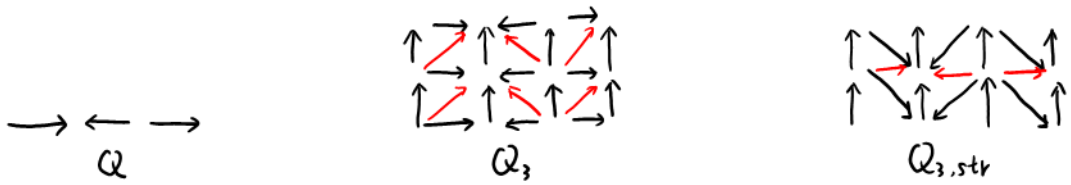
$\Phi(X)$: $X_x \to X_y \leftarrow X_z \to X_w$ (subrep in $Mod(R)$)

$\mathrm{Flag}_{3,str}(X) \longleftrightarrow \mathrm{Gr}(\Phi(X))$



Q $\quad Q_3$ $\quad Q_{3,str}$

$R = K(Q_d / \uparrow\rightarrow\uparrow)$ or $K(Q_{d,str} / \uparrow\searrow\uparrow)$ $\quad d \geq 2$



Q $\quad Q_3$ $\quad Q_{3,str}$

$\to$ is the virtual arrow

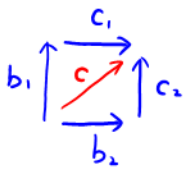
$\eta \in Ext^1(\Phi(S), \Phi(X))$

$Ext^1(W, \Phi(X))$

$\bar{\eta} \in Ext^1(W, \Phi(X)/V)$

$$\begin{array}{ccccccccc} 0 & \to & \Phi(X) & \to & \Phi(Y) & \xrightarrow{\pi} & \Phi(S) & \to & 0 \\ & & \| & & \uparrow & & \uparrow & & \\ 0 & \to & \Phi(X) & \to & \pi^{-1}(W) & \to & W & \to & 0 \\ & & \downarrow & & \downarrow & & \| & & \\ 0 & \to & \Phi(X)/V & \to & \pi^{-1}(W)/V & \to & W & \to & 0 \end{array}$$

$$0 \to \bigoplus_{c \in Q_2} Re_{t(c)} \otimes_k e_{s(c)} T \to \bigoplus_{b \in Q_1} Re_{t(b)} \otimes_k e_{s(b)} T \to \bigoplus_{i \in Q_0} Re_i \otimes_k e_i T \to T \to 0$$



$= c_1 b_1$

$= c_2 b_2$

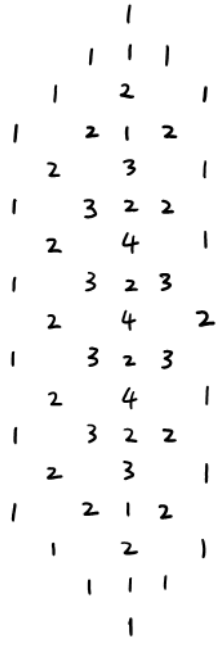
$r \otimes x \longmapsto rc_1 \otimes x + r \otimes b_1 x$

$-rc_1 \otimes x - r \otimes b_2 x$

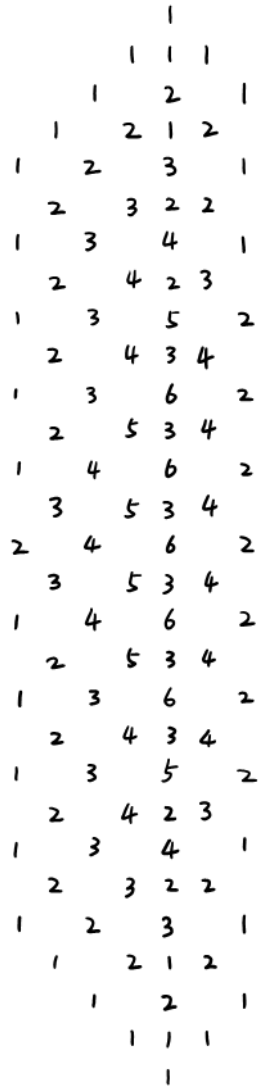
$r \otimes x \longmapsto rx$

$r \otimes x \longmapsto rb \otimes x - r \otimes bx$

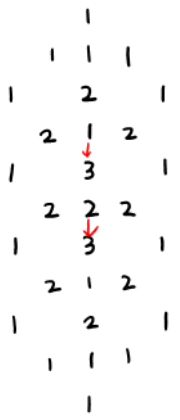
E_6



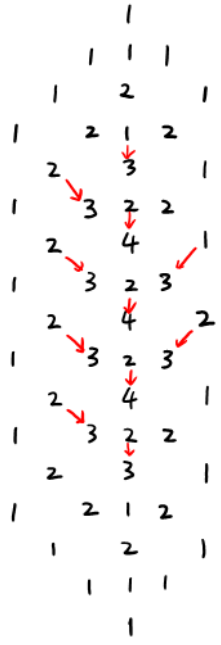
E_7



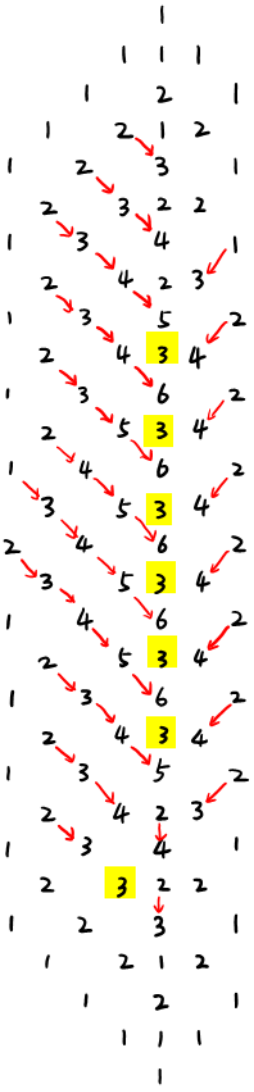
E_8



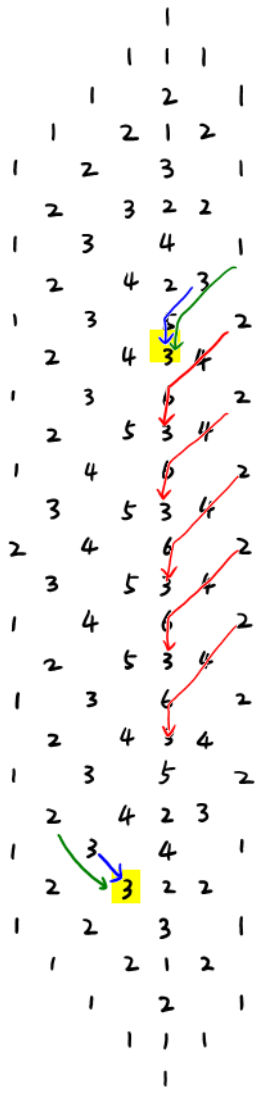
E_6



E_7



E_8, easy situation

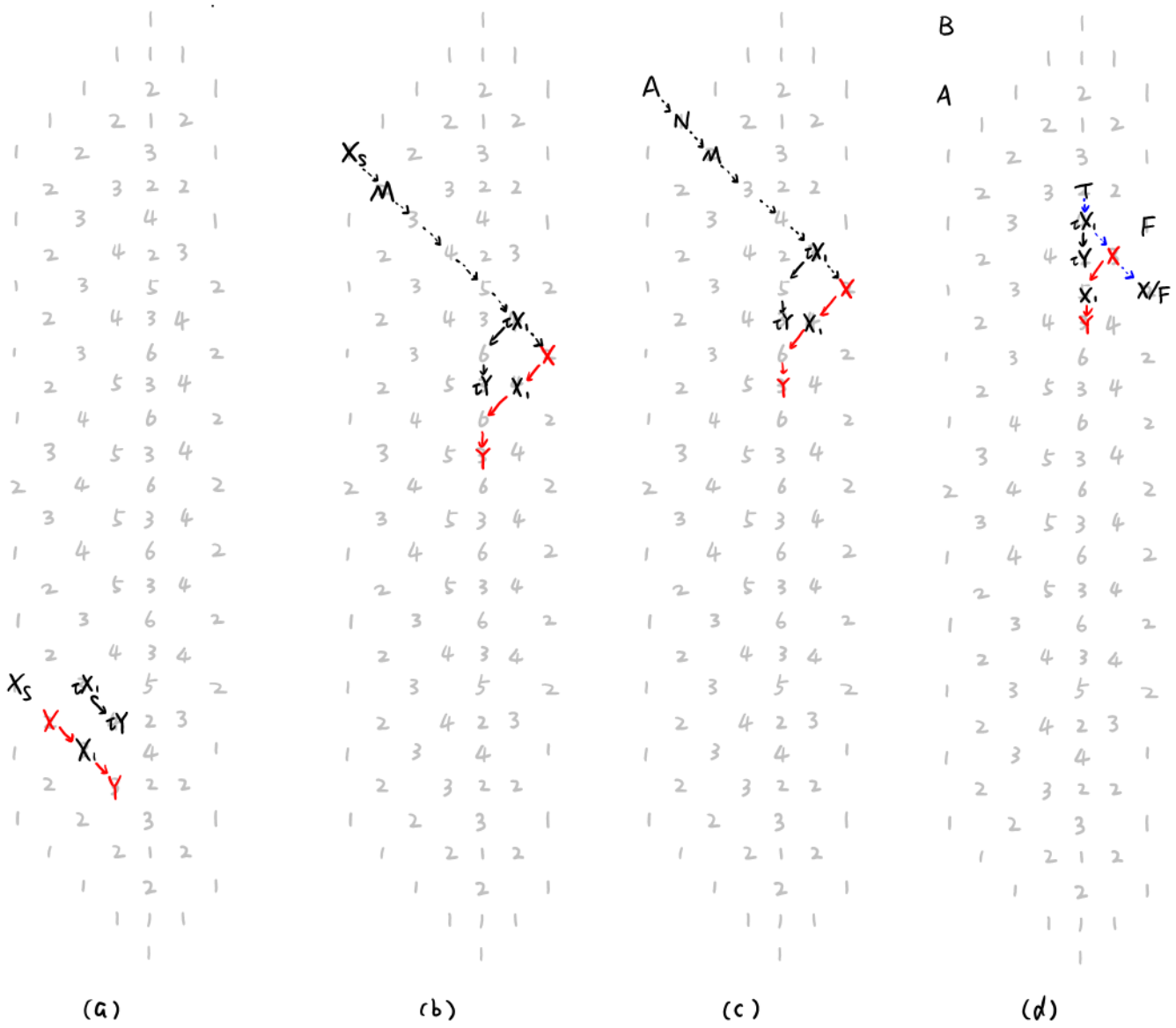


E_8, some exceptions

blue & green are two different possibilities.

$[M,N]$ / $[M,N]'$ (N \ M)	X	Y	S
X	$\begin{matrix}1\\0\end{matrix}$	$\begin{matrix}1\\0\end{matrix}$	$\begin{matrix}0\\0\end{matrix}$
Y	$\begin{matrix}0\\0\end{matrix}$	$\begin{matrix}1\\0\end{matrix}$	$\begin{matrix}1\\0\end{matrix}$
S	$\begin{matrix}0\\1\end{matrix}$	$\begin{matrix}0\\0\end{matrix}$	$\begin{matrix}1\\0\end{matrix}$

$$
\begin{array}{lccccccccc}
\eta \in Ext'(\bar{\Phi}(S),\bar{\Phi}(X)) & 0 & \longrightarrow & \Phi(X) & \longrightarrow & \Phi(Y) & \xrightarrow{\pi} & \Phi(S) & \longrightarrow & 0 \\
\downarrow & & & \| & & \uparrow & & \uparrow & & \\
Ext'(W,\bar{\Phi}(X)) & 0 & \longrightarrow & \Phi(X) & \longrightarrow & \pi^{-1}(W) & \longrightarrow & W & \longrightarrow & 0 \\
\downarrow & & & \downarrow & & \downarrow & & \| & & \\
\bar{\eta} \in Ext'(W,\Phi(X)/V) & 0 & \longrightarrow & \Phi(X)/V & \xrightarrow{\iota} & \pi^{-1}(W)/V & \underset{\theta}{\overset{\pi'}{\rightleftarrows}} & W & \longrightarrow & 0
\end{array}
$$


X_S
τX_1
τY
X
X_1
Y
X_S
M
τX_1
τY
X_1
A
N
M
τX_1
τY
X_1
B
A
T
τX_1
τY
F
X
X_1
X/F

(a) (b) (c) (d)