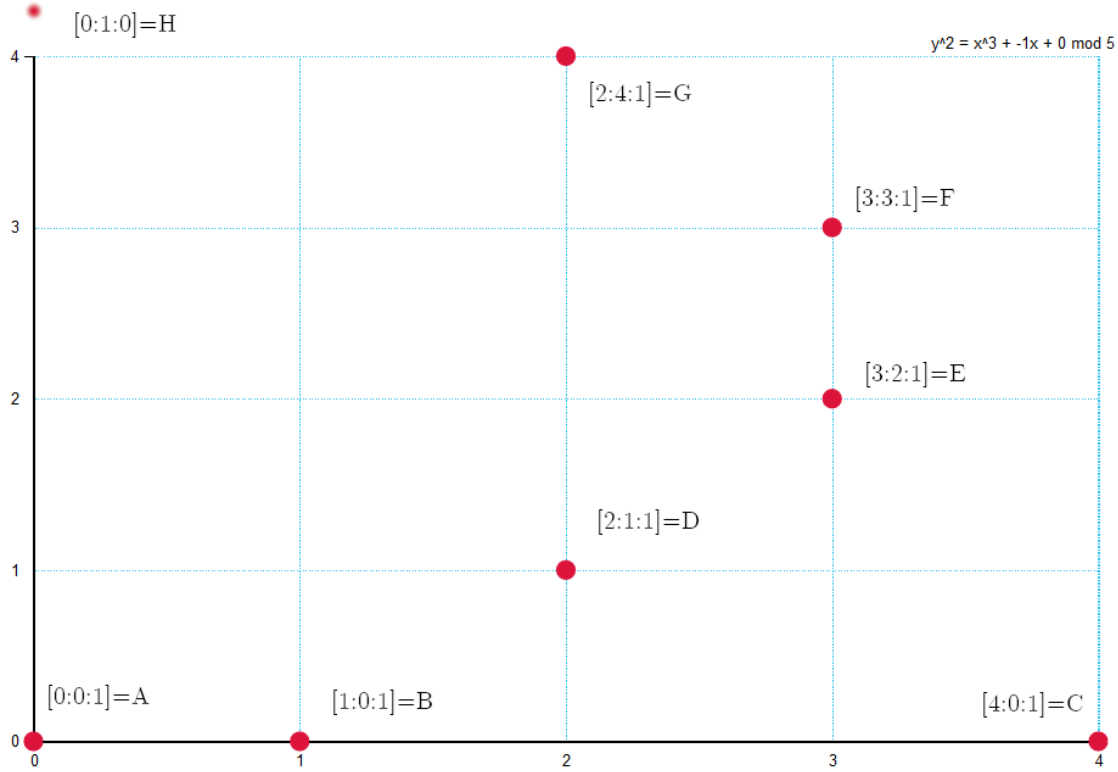


Consider the scheme  $X = \text{Proj}(\mathbb{Z}/5\mathbb{Z}[x, y, z]/(x^3 - y^2z - xz^2))$ . We have the following graph of  $X$  :



Note that  $3H = (z)$  and so  $H = 0 \in \text{Cl}^\circ X$ . Note that when  $x = 0$ , we have  $-y^2z = 0$ , which intersects  $A$  with multiplicity 2 and  $H$  with multiplicity 1. Therefore  $0 = (x) = 2A + H = 2A$ . Similarly, we have  $2B = 2C = 0$ .

Now let's look at the principal divisor  $(x - y)$ . We get the polynomial  $x^3 - x^2z - xz^2 = 0$ . This has a solution at  $A = [0 : 0 : 1]$  (note this does not have a solution at  $H$ , since the  $x$ -coordinate of  $H$  does not equal the  $y$ -coordinate of  $H$ ). This polynomial factors into  $x(x^2 - xz - z^2) = 0$ . Then we have  $(x^2 - xz - z^2) = (x - 3z)^2$ , which has a solution at  $F$  with multiplicity 2. Thus  $0 = A + 2F$ . Therefore  $0 = 2A + 4F = 4F$  and so  $3F = -F = E$ . Since  $E = -F$ , we also have  $4E = 0$ . Furthermore,  $2E = 2(3F) = 6F = 4F + 2F = 2F$ . Thus  $2E = 2F = -A = A$ .

We also have  $F + G + B = (3x - 2y - 3z) = 0$ , so  $F + G = B$  and  $F + B = D$  and  $G + B = E$ . Thus  $2(F + G) = 0$  and so  $A + 2G = 0$ , thus  $2G = A$ , so  $4G = 0$ . Similarly as before, this means  $2D = A$  and  $4D = 0$ , since  $D = -G$ .

Therefore  $\text{Cl}^\circ X$  has one element of order 1 ( $H$ ), three elements of order 2 ( $A$ ,  $B$ , and  $C$ ), and four elements of order 4 ( $D$ ,  $E$ ,  $F$ , and  $G$ ). Therefore  $\text{Cl}^\circ X \cong C_2 \times C_4$ . We can draw its Cayley graph as follows (generated by  $B$  and  $F$ ).

