| Title | K 3 surfaces and log del Pezzo surfaces of index three |
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We want to classify log del Pezzo surfaces of index $k$ ．
History of classification
－$k=1$ ：classical result
－$k=2$ ：Alexeev and Nikulin，Nakayama

Generalize the idea of［AN］to the $k=3$ case！
Review of［AN］（ $k=2$ case）
－Smooth Divisor Theorem
$\exists C \in\left|-2 K_{Z}\right|$ s．t．$C$ ：smooth curve and $C \not \supset$ singularities．
－Right resolution
In general，we get the following dual graph by the minimal resolution．
 －．
$\uparrow$ ：blow up at all intersection points

－Classification of non－symplectic involutions on K3 surfaces by Nikulin

We get a correspondence between $K 3$ surfaces with a non－symplectic involution and log del Pezzo sur－ faces of index 2.

Main Theorem（ $k=3$ case）
There exists a correspondence between $K 3$ surfaces with a non－symplectic automor－ phisms of order 3 and log del Pezzo surfaces of index 3.
－Multiple Smooth Divisor Property $\exists 2 C \in\left|-3 K_{Z}\right|$ s．t．$C$ ：smooth curve and $C \not \supset$ singularities．
－Right resolution
It is a successive union of the unit chain

$$
-3--1-6
$$

－Classification of non－symplectic auto－ morphisms of order 3 on $K 3$ surfaces by Artebani and Sarti，Taki（indepen－ dently）

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There exists a log del Pezzo surface of index 3 which does not satisfy MSDP．（ex． $\mathbb{P}(1,1,3)$ ） Thus the observation does not give the com－ plete classification．

## Example


triple cover branched along $\widetilde{C},(-6)$ and $(-3)$

－119－

$$
Z=(10) \subset \mathbb{P}(1,1,5,9)
$$


minimal resolution $\quad \frac{1}{9}(1,2) \operatorname{sing}$


