Zariski Topology

A subset of K^n is called an algebraic set if it is of the form Z(S).

because every point in IK satisfies the Zero polynomial.

$$\phi = Z(K(x_1, ..., x_n)) \text{ since } K(x_1, ..., x_n)$$
contains the 1 polynomial which can

never be 0.

The solutions that if
$$(\lambda_1, \dots, \lambda_m) \in Z(S_1, \dots, S_m)$$

$$= \{ \lambda_1, \dots, \lambda_m \} = \{ S_1, \dots, S_m | S_1, \dots, S_m \} \in Z(S_1, \dots, S_m) \in Z(S_1, \dots, S_m) \in Z(S_1, \dots, S_m) \}$$

Also $Z(S_1, \dots, S_m) \in Z(S_1, \dots, S_m)$

=>
$$L(S_1) \cup \ldots L(S_m) \subset L(S_1 \ldots S_m)$$

Conversely j ($\lambda_1, \ldots, \lambda_m$) $\subset Z$ ($S_1 \ldots S_m$)

Now j ($\lambda_1, \ldots, \lambda_m$) $\notin Z(S_1) \ \forall i, Then$

= $J_i \in S_i \ \forall i$ such that $J_i (\lambda_1, \ldots, \lambda_m) \neq 0$.

=> $J_i \ldots J_m \subset Z(S_1 \ldots S_m)$ but $J_i \ldots J_m (\lambda_1 \ldots \lambda_m) \neq 0$

which is a contradiction.

=> $U(S_i) = Z(S_1 \ldots S_m)$.

 $U(S_i) = Z(S_1 \ldots S_m)$.

 $U(S_i) = Z(S_1 \ldots S_m) = U(S_1 \ldots S_m)$.

Zet $(\lambda_1, \ldots, \lambda_m) \in \sum_{\alpha} Z(S_{\alpha})$ $\Rightarrow (\lambda_1, \ldots, \lambda_m) \in Z(US_{\alpha})$

The above properties tell us that

"" becomes a topological set if the

algebraic sets are closed. The topology

of K" is called the Zariski topology.

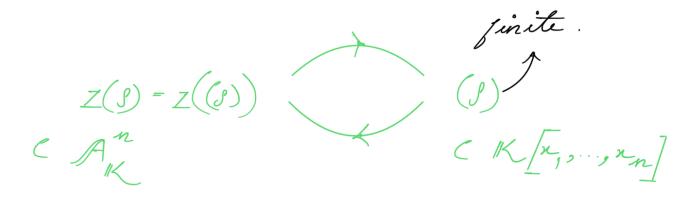
Any of the K[x,,,xn] gives a mapping

from An to AK.

We will denote the ideal generated by I by (I). (I) is thus the smallest ideal generated by J.

NT = (f)
ideal T
TCS

We will Jocus our study on



A commutative ring containing I, is

Northerian is every ideal is finitely

generated. And is R is Northerian,

then so is R[x,,,xn] This is called

Stilbert's Basis theorem / Emmy Norther's

theorem.

=> If Z(S) + \$\beta\$, then even if S is infinite,

(1) = (\int_1, \int_n) for some \int_1 \in K[\inf_1, \int_n].

Any field \(\text{T} \) is always Northerian since it has 2 ideals which are finitely generated:

(i) O ideal

(ii) full ideal generated by 1.

K[\int_1, \int_n] is Northerian

=> (S) is finitely generated regardless

of I being finite or infinite.