

# The counter example of Jacobson conjecture

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July 27, 2016

## 1

**Definition 1.1.** (*Jacobson radical*) In some ring  $R$ , all element makes all left side  $R$ -module  $\{0\}$  by multipling is called Jakobson radical.

Later,  $R$  is Noetherian ring.

### **Jacobson conjecture**

Jacobson radical  $J$  satisfies  $\bigcap_{n \in \mathbb{N}} J^n = \{0\}$ .

**Theorem 1.1.** *If  $J$  is not nilpotent ideal, Jacobson conjecture is not satisfied.*

**proof.**  $J$ 's rank is  $N$ .  $J$ 's generator is  $\alpha_1, \alpha_2, \dots, \alpha_N$ .  $J^2$ 's element is already Included in  $J$ .  $J^2 \neq \{0\}$ , this element is taken as not 0.  $J^3$ 's element is also Included in  $J$ . We call this element  $j$ .  $j$  is the sum of multiple  $J$ 's element and  $J$ 's element. So this element included in  $J^2$ .  $J$  is not nilpotent ideal,  $\bigcap_{n \in \mathbb{N}} J^n \neq \{0\}$ . Jacobson conjecture is not satisfied.  $\square$