

# [P] PERIODIC SYSTEM OF NUMBERS

[1]

|                     |                        |
|---------------------|------------------------|
| 1<br>$\mathbb{F}_1$ | Field with one element |
|---------------------|------------------------|

[2]. [1] ⊆ [2]

[9]

|      |   |   |  |                |
|------|---|---|--|----------------|
| II   | $\mathbb{F}_p$<br>Field with $p$ elements                           |   |  |                |
| III  | $\mathbb{F}_{p^2}$<br>Field with $p^2$ elements                     | $\mathbb{F}_p$ global<br>$\mathbb{F}_{p^2}(\mathbb{T})$<br>$\mathbb{F}_p$ -valued function field  |  |                |
| IV   | $\mathbb{F}_{p^3}$<br>Field with $p^3$ elements                     | $\mathbb{F}_p$ global<br>$\mathbb{F}_{p^3}(\mathbb{T})$<br>$\mathbb{F}_p$ -valued function field  | $\mathbb{F}_p$ local<br>$\mathbb{F}_p((\mathbb{T}))$<br>$\mathbb{F}_p$ -valued Laurent series  | [4]. [3] ⊆ [4] |
| V    | $\mathbb{F}_{p^4}$<br>Field with $p^4$ elements                     | $\mathbb{F}_p$ global<br>$\mathbb{F}_{p^4}(\mathbb{T})$<br>$\mathbb{F}_p$ -valued function field  | $\mathbb{F}_p$ local<br>$\mathbb{F}_p((\mathbb{T}))$<br>$\mathbb{F}_p$ -valued Laurent series  |                |
| VIII | $\mathbb{F}_{p^5}$<br>Field with $p^5$ elements                     | $\mathbb{F}_p$ global<br>$\mathbb{F}_{p^5}(\mathbb{T})$<br>$\mathbb{F}_p$ -valued function field  | $\mathbb{F}_p$ local<br>$\mathbb{F}_p((\mathbb{T}))$<br>$\mathbb{F}_p$ -valued Laurent series  |                |
| VI   | $\mathbb{F}_{p^n}$<br>Field with $p^n$ elements                     | $\mathbb{F}_p$ global<br>$\mathbb{F}_{p^n}(\mathbb{T})$<br>$\mathbb{F}_p$ -valued function field  | $\mathbb{F}_p$ local<br>$\mathbb{F}_p((\mathbb{T}))$<br>$\mathbb{F}_p$ -valued Laurent series  |                |
| VII  | $\mathbb{F}_{p^{n+1}}$<br>Field with $p^{n+1}$ elements             | $\mathbb{F}_p$ global<br>$\mathbb{F}_{p^{n+1}}(\mathbb{T})(A)$<br><i>Finite algebraic extension of <math>\mathbb{F}_{p^n}(\mathbb{T})</math></i>          | $\mathbb{F}_p$ local<br>$\mathbb{F}_{p^n}((\mathbb{T}))(A)$<br><i>Finite algebraic extension of <math>\mathbb{F}_{p^n}((\mathbb{T}))</math></i>              |                |
| IX   | $\overline{\mathbb{F}_p}$<br>Algebraic closure of $\mathbb{F}_p$    | $\mathbb{F}_p$ global<br>$\overline{\mathbb{F}_{p^n}(\mathbb{T})}$<br><i>Algebraic closure of <math>\mathbb{F}_{p^n}(\mathbb{T})</math></i>               | $\mathbb{F}_p$ local<br>$\overline{\mathbb{F}_{p^n}((\mathbb{T}))}$<br><i>Algebraic closure of <math>\mathbb{F}_{p^n}((\mathbb{T}))</math></i>               |                |
| X    | $\widehat{\mathbb{F}_p}$<br>Completion of $\overline{\mathbb{F}_p}$ | $\mathbb{F}_p$ global<br>$\widehat{\overline{\mathbb{F}_{p^n}(\mathbb{T})}}$<br><i>Completion of <math>\overline{\mathbb{F}_{p^n}(\mathbb{T})}</math></i> | $\mathbb{F}_p$ local<br>$\widehat{\overline{\mathbb{F}_{p^n}((\mathbb{T}))}}$<br><i>Completion of <math>\overline{\mathbb{F}_{p^n}((\mathbb{T}))}</math></i> |                |

[5]. [5] ⊆ [9] [6]. [6] ⊆ [9]

|                                 |  |  |  |  |
|---------------------------------|--|--|--|--|
| <b>Card</b><br>Cardinal numbers | $^*\mathbb{N}$<br>Hypersatural numbers |  | $\mathbb{N}_0$<br>Natural numbers                          |  |
| <b>Ord</b><br>Ordinal numbers   | $^*\mathbb{Z}$<br>Hyperintegers        | $\hat{\mathbb{Z}}$<br>Profinite integers   | $\mathbb{Z}$<br>Integers                                   | [10]. [10] ⊆ [9]   |
| <b>Sur</b><br>Surreal numbers   | $^*\mathbb{Q}$<br>Hyperreal numbers    | $\mathbb{A}_F$<br>Adèle ring of number field $F$                                     | $\mathbb{Q}$<br>Rational numbers                           | $\mathcal{O}_{\mathbb{Q}(A)}$<br>Ring of integers of $\mathbb{Q}(A)$ |
|                                 | $^*\mathbb{R}$<br>Hyperreal numbers    |  | $\mathbb{R}$<br>Real numbers                               | $\mathbb{Q}(A)$<br>Finite algebraic extension of $\mathbb{Q}$        |
|                                 | $^*\mathbb{C}$<br>Hypercomplex numbers | $\mathbb{H}^{\oplus 2}$<br>Split-quaternions   | $\mathbb{C}$<br>Complex numbers                            | $\overline{\mathbb{Q}}$<br>Algebraic closure of $\mathbb{Q}$         |
|                                 |  | $\mathcal{Cl}_{i,j}(\mathbb{R})$<br><i>Real <math>(p, q)</math>-Clifford algebra</i> | $\mathbb{H}$<br>Quaternions                                | $\mathbb{C}^{\oplus 2}$<br>Bicomplex numbers                         |
|                                 |  |  | $\mathbb{O}$<br>Octonions                                  | $\mathcal{Cl}_2(\mathbb{C})$<br>Biquaternions                        |
|                                 |  |  | $\mathbb{S}$<br>Sedenions                                  | $\mathcal{Cl}_n(\mathbb{C})$<br>Complex $n$ -Clifford algebra        |
|                                 |  |  | $\text{CD}_{\mathbb{R}}(n)$<br>Cayley-Dickson construction |  |

[12]. [12] ⊆ [9]

|  |  |   |
|--|--|---|
| $\mathbb{Z}_p$<br>$p$ -adic integers                             | $\mathcal{O}_{\mathbb{Q}_p(A)}$<br>Ring of integers of $\mathbb{Q}_p(A)$ | $\mathbb{Q}_p$<br>$p$ -adic rational numbers                      |
| $\overline{\mathbb{Q}_p}$<br>Algebraic closure of $\mathbb{Q}_p$ |  | $\mathbb{Q}_p(A)$<br>Finite algebraic extension of $\mathbb{Q}_p$ |

[14]. [14] ⊆ [9]

[15]. [15] ⊆ [9] [16]. [16] ⊆ [9]

|   |  |
|---|--|
| $\mathbb{R}[\epsilon]/(\epsilon^2)$<br>Dual numbers | $\mathbb{R}^{\oplus 2}$<br>Split-complex numbers |
|---|--|

- Field
- Commutative ring
- Semiring
- Associative division ring
- Division ring
- Real algebra
- $0 = 1$
- Proper class

|  |
|--|
| <b>char</b> <small>property (of field)</small> |
| <b>Symbol</b>                                  |
| Name   |

$n, i, j \in \mathbb{N}_0$ ,  
 $p$  prime