Package 'matrixmodp'

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Title Working with Matrices over Finite Prime Fields

Version 0.2.0

Description Provides functions for row-reducing and inverting matrices with entries in many of the finite fields (those with a prime number of elements). With this package, users will be able to find the reduced row echelon form (RREF) of a matrix and calculate the inverse of a (square, invertible) matrix.

License GPL (>= 2)

Encoding UTF-8

RoxygenNote 7.3.1

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

URL https://github.com/rhigginbottom/matrixmodp, https://rhigginbottom.github.io/matrixmodp/

BugReports https://github.com/rhigginbottom/matrixmodp/issues

NeedsCompilation no

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inv_p *Calculate the inverse of a matrix mod p*

Description

`inv_p()` finds the inverse of a square matrix over the field F_p. The function checks for invertibility and then row-reduces the augmented matrix $[A|I]$ over F_p to find the inverse.

Usage

```
inv_p(A, p)
```

Arguments

`A`	A square matrix
`p`	A prime integer

Value

A square matrix of the same size as `A`

Examples

```
B <- matrix(c(5, 2, 3, 6, 5, 5, 4, 0, 2), 3, 3)
inv_p(B, 7)
C <- matrix(c(3, 0, 4, 0, 2, 1, 1, 3, 0, 3, 0, 1, 3, 0, 2, 1), 4, 4)
inv_p(C, 5)
```

rref_p *Find the RREF of a matrix mod p*

Description

`rref_p()` calculates the unique reduced-row echelon form of a matrix with entries in the finite field F_p.

Usage

```
rref_p(A, p)
```

Arguments

`A`	A matrix
`p`	A prime integer

Value

A matrix of the same size as `A` which is the unique reduced-row echelon form of `A`.

Examples

```
B <- matrix(c(3, 4, 1, 3, 2, 0), 2, 3)
rref_p(B, 5)
C <- matrix(c(0, 2, 0, 0, 0, 2, 0, 1, 1), 3, 3)
rref_p(C, 3)
```

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