

# Library For Exact Linear Algebra

LinBox Project

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## Introduction





## I) LinBox Design

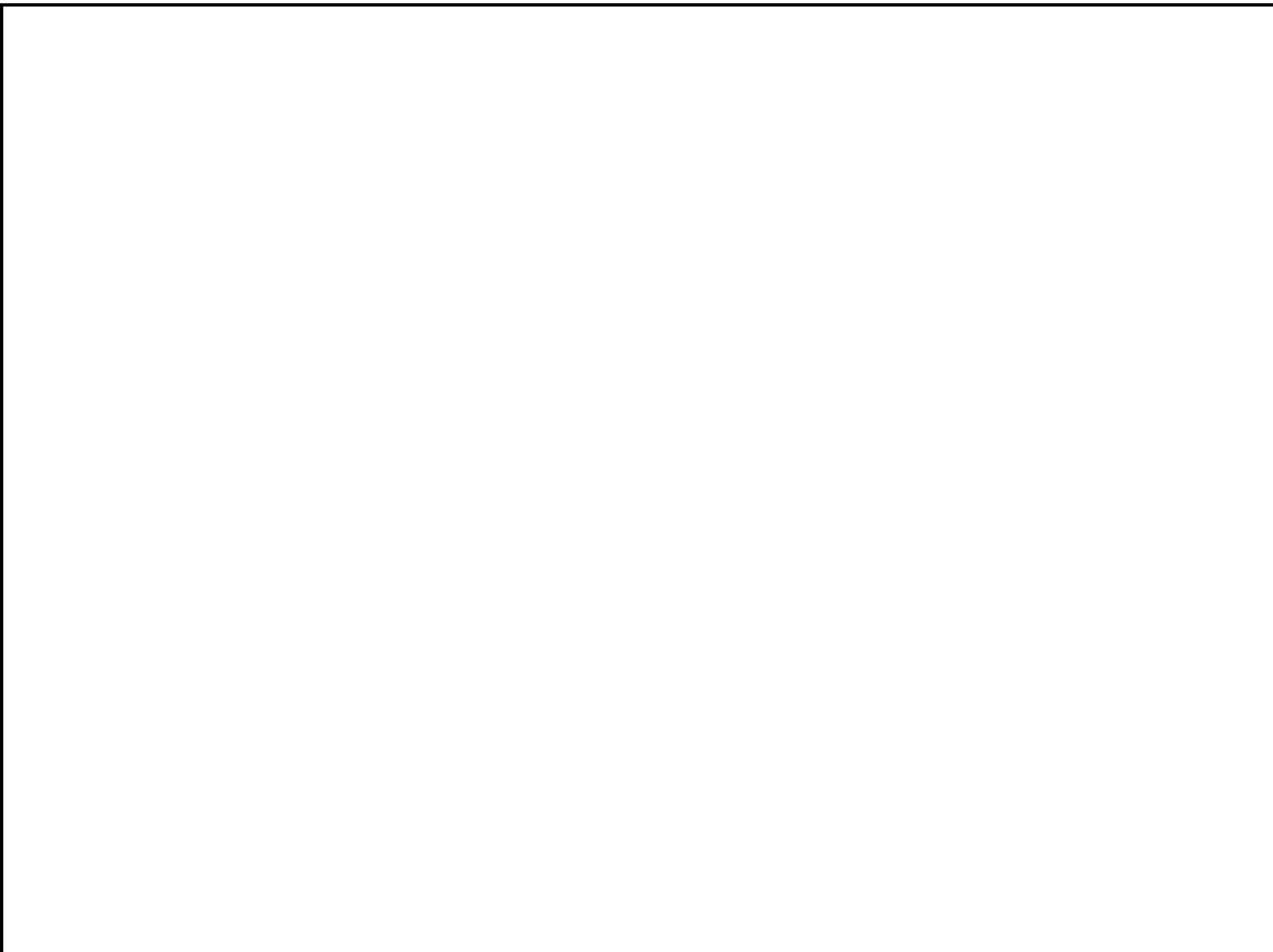


## Field design (coefficient domains)

- Parameterized with encapsulated element and random element generator types.
- Elements: contain no information about the field.
- Fields: contain methods for element assignment, equality, arithmetic, IO:

```
x = y      : F.assign(x,y)
x == y     : F.areEqual(x,y)
x = y + z  : F.add(x,y,z)
cout<< x   : F.write(cout,x)
```

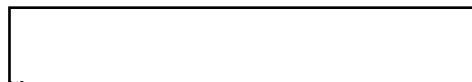
- Most field implementations are external to the library; they are integrated through wrappers.



## LinBox Field code example



```
#include <
```











## Today's Available Library code

- Specialized finite field arithmetic (extensions, tables, polynomials).

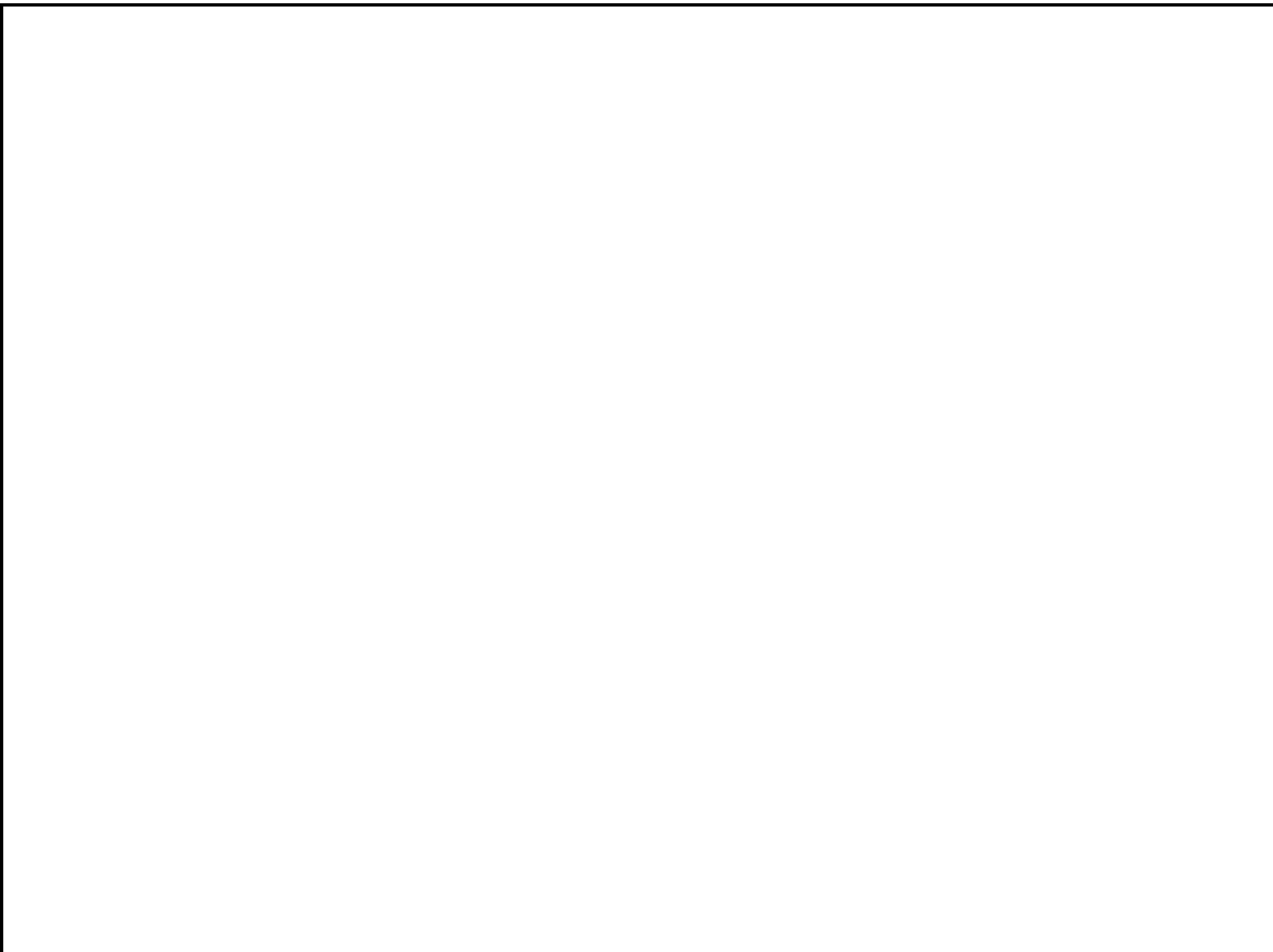
- Solutions :

| Today's Available Online Software at [\*www.linalg.org\*](http://www.linalg.org)





### III) Computational experiments



## Efficiency of LinBox Algorithms

- Rank computation (Gaussian elimination, SuperLU, Wiedemann).  
LinBox:

