

## CoCoALib - Design #1467

### Change syntax `apply(phi,M)` into `phi(M)`?

22 Jun 2020 10:39 - John Abbott

|  |                  |                        |             |
|--|------------------|------------------------|-------------|
| <b>Status:</b>   | Closed           | <b>Start date:</b>     | 22 Jun 2020 |
| <b>Priority:</b>   | Normal           | <b>Due date:</b>       |             |
| <b>Assignee:</b>   | John Abbott      | <b>% Done:</b>         | 100%        |
| <b>Category:</b>   | Improving        | <b>Estimated time:</b> | 2.01 hours  |
| <b>Target version:</b>   | CoCoALib-0.99800 | <b>Spent time:</b>     | 1.95 hour   |
| <b>Description</b><br>Currently to apply a RingHom to the entries of a matrix or a C++ vector we must use the fn <b>apply</b> .<br><br>Is it better to use simpler notation where the RingHom can be applied directly: <i>e.g.</i> <code>phi(M)</code> or <code>phi(v)</code> ?<br><br>Pros and cons? Opinions?<br><br>Relevant source file is <code>apply.H</code>                |                  |                        |             |
| <b>Related issues:</b><br>Related to CoCoALib - Bug #1601: Compilation ambiguity <b>Closed</b> <b>16 Jun 2021</b><br>Related to CoCoALib - Feature #1598: RingHom: implement <code>phi(X)</code> as <code>apply(phi, ...)</code> <b>Closed</b> <b>10 Jun 2021</b><br>Related to CoCoA-5 - Design #1615: <code>apply</code> : remove for RingHom <b>Rejected</b> <b>04 Oct 2021</b> |                  |                        |             |

#### History

##### #1 - 22 Jun 2020 10:44 - John Abbott

I noticed this while making a prototype impl for automatic ringelem promotion. In particular for ringelem times matrix the code ended up like this (**!!!note!!! the code has changed slightly due to issue [#635](#)**)

```
const RingHom promote = AutomaticConversionHom(Rx,R, "RingElem*Mat");
if (codomain(promote) == Rx)
    return x * apply(promote,M);
return promote(x) * M;
```

It would be slightly neater if I could write `promote(M)` instead of `apply(promote,M)`.

A feature of writing `apply(...)` is that it is obvious to the reader that `M` is not a plain ringelem (but that ought to be clear anyway).

At the moment, it seems to me to be "useless clutter". Some might argue that applying a ringhom directly to a matrix is an "abuse of notation" (but it is also clear, unambiguous and compact...)

**NOTE** aha! I see that CoCoA-5 wants to use `apply` when applying a ringhom to MAT, LIST or RINGELEM (why this last one???)

##### #2 - 22 Jun 2020 10:54 - John Abbott

- Status changed from New to In Progress

- % Done changed from 0 to 10

We could permit both syntaxes, perhaps making **apply(...)** obsolescent?  
[JAA does not much like having two different but semantically equivalent syntaxes]

Or we could change CoCoA-5 too? Making **apply(...)** there obsolescent?

Opinions?

**#3 - 22 Jun 2020 11:00 - John Abbott**

- Description updated

**#4 - 29 Oct 2020 13:35 - John Abbott**

- Target version changed from CoCoALib-0.99800 to CoCoALib-0.99850

**#5 - 02 Aug 2021 09:53 - John Abbott**

- Related to Bug #1601: Compilation ambiguity added

**#6 - 04 Oct 2021 11:50 - John Abbott**

- Assignee set to John Abbott

- % Done changed from 10 to 90

In the end my hand was forced.

Some future version of C++ (maybe C++17?) defines a template fn **apply** which matches better than the CoCoA fns; there really seemed to be no way to make C++ use the CoCoA fns, so compilation failed. Perhaps the problem could be resolved using C++20 (with restrictions on when templates will match)? Anyway, not practicable at the moment.

So I have removed **apply** from CoCoALib, and changed all code which used it.  
Everything compiles, and all tests pass.

Moving to "feedback".

**#7 - 17 Feb 2022 19:33 - John Abbott**

- Target version changed from CoCoALib-0.99850 to CoCoALib-0.99800

**#8 - 18 Feb 2022 15:02 - Anna Maria Bigatti**

- Related to Feature #1598: RingHom: implement  $\phi(X)$  as  $\text{apply}(\phi, X)$  also for  $X$  vector and matrix added

**#9 - 18 Feb 2022 15:03 - Anna Maria Bigatti**

This issue overlaps with Feature [#1598](#).

**#10 - 18 Feb 2022 15:04 - Anna Maria Bigatti**

- Related to Design #1615: **apply**: remove for RingHom added

**#11 - 18 Feb 2022 15:24 - Anna Maria Bigatti**

- Status changed from In Progress to Closed

- % Done changed from 90 to 100

- Estimated time set to 2.01 h