What's New in ACL2

April 8, 2002

Matt Kaufmann
(Advanced Micro Devices, Inc.)

J Strother Moore
(The University of Texas)

⌊ Introduction ⌋

We summarize these documentation topics (and subtopics):

- **NOTE-2-6** (changes in Version 2.6)
- **NOTE-2-7** (changes in Version 2.7, under development)

GOAL: Call attention to new features of ACL2 and changes in behavior.

If time permits then we may elaborate on a few of these features.

To sign up for mailing lists, follow the "Useful Addresses" link from the ACL2 home page, http://www.cs.utexas.edu/users/moore/acl2/. Note: The new list

`acl2-help@lists.cc.utexas.edu`

is a great place for ACL2 usage questions.

In this talk we reference the following people for their help, ranging from bringing problems to our attention to coming up with the idea and the initial implementation. See documentation topics for details.

Michael **Bogo**molny
Scott Burson
Wolfhard Buss
Yunja Choi
John Cowles
Art Flatau
Robert Krug
Pete Manolios
Francisco J. Martin-Mateos
Eric Smith
Rob Sumners
Matyas Sustik
Vinay K. Siddhavanahalli
Sam Steingold
Matt Wilding

⌊ NOTE-2-7 ⌋

- Fixed two soundness bugs, one in functional instantiation and one in the bdd package. [Francisco, Rob].

- Search is used for relieving hypotheses with free variables, but is under some user control.

- New bind-free construct allows user to specify how free variables are bound. [Eric, Robert]

- Non-linear arithmetic support has been added (but is off by default). [Robert]

⌊ NOTE-2-6-GUARDS ⌋

- Guards are extended for stobj declarations.

- Some new guards restrict to standard characters.

⌊ NOTE-2-6-NEW-FUNCTIONALITY ⌋

- Nu-rewriter (outside-in rewriting).

- Non-executable flag.

- Set-let*-abstractionp introduces LET* notation in output.

- Raw mode allows evaluation of Lisp forms and fast loading of books.

- A total order has been added in :logic mode. [Pete, Rob]

- System calls are supported. [Rob, Pete, Robert]

- More platforms: Allegro CL 6.0, Windows, CLISP, CMU Lisp. [Pete, Vinay, Wolfhard, Sam]

- Relative pathnames are ok in the portcullis.

- Stobjs can be resized and (when there are many fields) have improved performance. The resizing involves changes in auxiliary functions generated by defstobj, which can affect proofs. [Rob]

- With-local-stobj allows local stobjs. [Rob]

- New fmt functions allow reading output back in.

- Extended metafunctions. [Robert]

- More/better doc topics (including arrays-example, proof-tree-emacs, functional-instantiation-example). [Eric and others]

- Makefile targets allow compilation of existing books.

- Let* allows (declare (ignore ...)). [Rob]

- User-controlled backchaining (backchain-limit) [Robert] and case splitting (set-case-split-limitations).

- Stobj accesses are printed with constants, e.g., (nth *a* foo), and this feature can extend to non-stobj variable names (nth-aliases-table).

- Hints improvements: More powerful computed hints (stability detection, change to list of available hints), default hints (set-default-hints), priority-based simplification.

- Defabbrev is more robust (declare forms, doc strings, error checking). [Rob]

- Improved output for (conceptually) associative operators, including logand, logior, logxor, and logeqv (which are now macros). [Rob]

- Search engine. [Bogo]

- Helpful .emacs file.

- More books, especially arithmetic-2 [Robert].

⌊ NOTE-2-6-OTHER ⌋

- Bunches of minor fixes and improvements, including:
  - Warning on weak :type-prescription rules
  - More efficient exection in Allegro CL for tail-recursive functions without verified guards
  - Some small improvements to the proof checker (see :DOC NOTE-2-6-PROOF-CHECKER). [Pete]
  - Bugs in defun-sk have been fixed. [John, Matyas]

⌊ NOTE-2-6-PROOFS ⌋

- New optimizations in clausification.

- Lambda terms are not always simplified away immediately during a proof.

- Soundness bug fix for linear arithmetic. [Robert]

- Other bug fixes: missing applications of metatheorems, bogus forcing rounds [Rob], some infinite loops [Yunja, Matt W, Pete], (potential soundness) evaluation, and type-prescription rules in bdd package [Rob].

- Some miscellaneous heuristic changes: backchaining, keep certain hypotheses [Robert], limit case splits, and assuming (and x y) true (which now assumes x and y true individually) [Robert].

- Change in induction heuristics involving disabled functions: a disabled function contributes to determination of induction schemes unless its induction rune is also disabled.

- We eliminated the rule class :linear-alias.

- Goals are printed without waiting for subgoals or for the goal to be proved.

- Minor change has been made in term-order. [Robert]

⌊ NOTE-2-6-RULES ⌋

- Some minor changes/additions have been made to existing rewrite rules, functions, and constants.

- Zp and zip are disabled but with compound-recognizers.

- Variants of equal (e.g., =) act like equal for purposes of storing rewrite rules.

⌊ **NOTE-2-6-SYSTEM** ⌋

• Potential soundness fix: better tracking of skip-proofs events.

• Some small changes have been made to the distributed book directories, including improved certification infrastructure [John, Scott].

• The notion of ACL2 version has been slightly modified [Art].