

\$SPAD/src/input Makefile

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Abstract

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1 Introduction

This creates the `mnt/sys/input` subdirectory. The files are known as “input” files which are a list of Axiom commands. Each file (say “foo.input”) can run in an Axiom system with the command:

```
)read foo.input
```

Each of the files in this subdirectory is intended to achieve a three goals. First, the file shows examples of how to use Axiom algebra. Second, the file is used as a regression test to show that Axiom properly executes the algebra. Third, the file contains documentation on known bugs or missing algebra.

It is important to collect as many examples as we can of working algebra. In particular, we need machinery to extract algebra from other pamphlet files and automatically make them into input files. The more algebra we collect, use, and regression test the more robust the system will be.

When used to build a shipping system the default stanza “use” will build files that show working algebra examples.

When used for regression testing the stanza “regress” is used to build all of the working examples, run them, and compare them against known good output. Differences are highlighted and need to be documented or fixed.

When used for bug testing the stanza “bug” is used to build the algebra with known bug chunks included. These are run to check that known bugs have been fixed before shipping. Fixed code should be moved to the “regress” status, new working examples are built and the system should be built using “regress” to check that the build did not break anything.

1.1 genericRules

We use the special `.PRECIOUS` target to prevent deletion of the intermediate `.input` files which are needed during the processing of `regress` target.

— genericRules —

```

${OUT}/%.input: ${MID}/%.input
@ echo si01 making ${OUT}/$*.input from ${MID}/$*.input
@ cp ${MID}/$*.input ${OUT}/$*.input

.PRECIOUS: ${MID}/%.input

LISPTANGLE=${OBJ}/${SYS}/bin/lisp

${MID}/%.input: ${IN}/%.input.pamphlet
@ echo si02 making ${MID}/$*.input from ${IN}/$*.input.pamphlet
@ (cd ${MID} ; \
    echo '(tangle "${IN}/$*.input.pamphlet" "*" "$*.input")' | \
    ${LISPTANGLE} )

${OUT}/%.as: ${MID}/%.as
```

```

@echo si03 making ${OUT}/${*.as} from ${MID}/${*.as}
@ cp ${MID}/${*.as} ${OUT}/${*.as}

${MID}/%.as: ${IN}/%.as.pamphlet
@echo si04 making ${MID}/${*.as} from ${IN}/${*.as.pamphlet}
@(cd ${MID} ; \
    ${BOOKS}/tanglec ${IN}/${*.as.pamphlet} >${*.as})

${DOC}/axiom.sty:
@echo si05 making ${DOC}/axiom.sty from ${BOOKS}/axiom.sty
@cp ${BOOKS}/axiom.sty ${DOC}

${DOC}/%.input.dvi: ${IN}/%.input.pamphlet ${DOC}/axiom.sty
@ echo si06 making ${DOC}/${*.input.dvi} from \
    ${IN}/${*.input.pamphlet}
@ if [ "${BUILD}" = "full" ] ; then \
( cd ${DOC} ; \
cp ${IN}/${*.input.pamphlet} ${DOC} ; \
latex ${*.input.pamphlet} ; \
dvi2pdf ${*.input.dvi} ; \
rm -f ${DOC}/${*.input.pamphlet} ; \
rm -f ${DOC}/${*.input.dvi} ; \
rm -f ${DOC}/${*.input.aux} ; \
rm -f ${DOC}/${*.input.log} ; \
rm -f ${DOC}/${*.input.toc} ) ; fi

${DOC}/%.as.dvi: ${IN}/%.as.pamphlet
@ echo si07 making ${DOC}/${*.as.dvi} from ${IN}/${*.as.pamphlet}
@ (cd ${DOC} ; \
cp ${IN}/${*.as.pamphlet} ${DOC} ; \
${EXTRACT} ${*.as.pamphlet} ; \
rm -f ${DOC}/${*.as.pamphlet} ; \
rm -f ${DOC}/${*.as.tex} ; \
rm -f ${DOC}/${*.as.dvi} ; \
rm -f ${DOC}/${*.as} )

```

2 Testing stanzas (to be added)

— testing —

```

.SUFFIXES: .input .out

TESTSYS= ${OBJ}/${SYS}/bin/interpsys

```

```

IN= ${SRC}/input

MID= ${INT}/input

OUT= ${OBJ}/${SYS}/input

INPUT=  ${MNT}/${SYS}/src/input

DOC=    ${MNT}/${SYS}/doc/src/input

all: announce
@ echo si08 making ${MID}
@ cp -p ${IN}/*.input ${MID}
@ cp -p ${IN}/axiom.test ${MID}/axiom.input
@ cp ${IN}/Makefile.int ${MID}/Makefile
@ (cd ${MID} ; \
    for i in *.input ;do \
        if test ! -f 'basename $$i .input'.rec ;then \
            echo aging ${MID}/'basename $$i .input'.rec ; \
            ${TOUCH} 0101010189 'basename $$i .input'.rec ;fi ;done)
@ (cd ${MID} ; ${MAKE} -f Makefile 'echo *.rec' )
@ cp ${IN}/Makefile.obj ${OUT}/Makefile
@ cp -p ${MID}/*.rec ${OUT}
@ cp -p ${IN}/axiom.test ${MID}/axiom.input
@ (cd ${OUT} ; \
    for i in *.rec ;do \
        if test ! -f 'basename $$i .rec'.out ;then \
            echo aging ${OUT}/'basename $$i .rec'.out ; \
            ${TOUCH} 0101010189 'basename $$i .rec'.out ;fi ;done)
@ (cd ${OUT} ; ${MAKE} -f Makefile 'echo *.out' )
# @ (cd ${OUT} ; maildiff )
@ echo done

announce:
@ echo =====
@ echo src/input BUILDING INPUT FILES
@ echo =====

.SUFFIXES: .input .rec

all:    ${OUTS}
@ echo si09 done with ${OUTS}

.input.rec:
@ echo si10 creating 'pwd'/'$*.rec
@ axiom -rm $*.input

and still further stanzas

.SUFFIXES: .rec .out

```

```

all: ${OUTS}
@ echo si11 obj done with ${OUTS}

.rec.out:
@ echo si12 running rec file $* from directory 'pwd'
@ axiom -rv $*.rec

```

3 The regression testing Makefile

This Makefile will be notangled into the int/input subdirectory. It will run regression tests over all of the input files. This will catch things we break but won't catch wrong results that were wrong in the past. Every input file that gets regression tested is assumed to have been hand-verified before it was added to the list.

— regression tests —

```

.SUFFIXES: .input .output

DAASE=${MNT}/${SYS}
TESTSYS=${OBJ}/${SYS}/bin/interpys

SKIP= as-eg1.output as-eg2.output \
      as-eg3.output as-eg4.output as-eg5.output as-eg6.output \
      bern.output bernpoly.output \
      c02aff.output \
      c02agf.output c05adf.output c05nbf.output c05pbf.output \
      c06eaf.output c06ebf.output c06ecf.output c06ekf.output \
      c06fpf.output c06fqf.output c06frf.output c06fuf.output \
      c06gbf.output c06gcf.output c06gqf.output c06gsf.output \
      cdraw.output color.output cone.output \
      coordsys.output \
      cycloid2.output cycloid3.output cycloid.output \
      d01ajf.output d01akf.output d01alf.output d01amf.output \
      d01anf.output d01apf.output d01aqf.output d01asf.output \
      d01bbf.output d01fcf.output d01gaf.output d01gbf.output \
      d02bbf.output d02bhf.output d02cjf.output d02ejf.output \
      d02gaf.output d02gbf.output d02kef.output d02raf.output \
      d03edf.output d03eef.output d03faf.output damped.output \
      de2re.output defs.output \
      draw2dsf.output drawalg.output drawcfn.output drawcfun.output \
      drawcurv.output drawcx.output drawex.output draw.output \
      drawpoly.output drawx.output dropt.output e01baf.output \
      e01bef.output e01bff.output e01bgf.output e01bhf.output \
      e01daf.output e01saf.output e01sbf.output e01sef.output \

```

e01sff.output	e02adf.output	e02aef.output	e02agf.output	\
e02ahf.output	e02ajf.output	e02akf.output	e02baf.output	\
e02bbf.output	e02bcf.output	e02bdf.output	e02bef.output	\
e02daf.output	e02dcf.output	e02ddf.output	e02def.output	\
e02dff.output	e02gaf.output	e02zaf.output	e04dgm.output	\
e04fdf.output	e04gcf.output	e04jaf.output	e04mbf.output	\
e04naf.output	e04ucf.output	e04ycf.output	egg.output	\
explo2d.output	explo3d.output	\		
f01brf.output	f01bsf.output	f01maf.output	\	
f01mcf.output	f01qcf.output	f01qdf.output	f01qef.output	\
f01rcf.output	f01rdf.output	f01ref.output	f02aaf.output	\
f02abf.output	f02adf.output	f02aef.output	f02aff.output	\
f02agf.output	f02ajf.output	f02akf.output	f02awf.output	\
f02axf.output	f02bbf.output	f02bjf.output	f02fjf.output	\
f02wef.output	f02xef.output	f04adf.output	f04arf.output	\
f04asf.output	f04atf.output	f04axf.output	f04faf.output	\
f04jgf.output	f04maf.output	f04mbf.output	f04mcf.output	\
f04qaf.output	f07adf.output	f07aef.output	f07fdf.output	\
f07fef.output	folium.output	gary1.output	gnarly1.output	\
graphics.output	grdef.output	helix.output	\	
images1a.output	images1.output	images2a.output	images2.output	\
images3a.output	images3.output	images5a.output	images5.output	\
images6a.output	images6.output	images7a.output	images7.output	\
images8a.output	images8.output	inputform.output	\	
knot.output	knownbugs.output	\		
liss1.output	liss2.output	lump.output	matrox.output	\
mountain.output	mult2d.output	mult3d.output	multknot.output	\
ntube.output	palette.output	parpcurv.output	parscurv.output	\
parsurf.output	pinch.output	plotfile.output	\	
plotlist.output	pollevel.output	ribbon.output	\	
ribbons.output	ribbonsnew.output	rk4draw.output	\	
s01eaf.output	s13aaf.output	s13acf.output	s13adf.output	\
s14aaf.output	s14abf.output	s14baf.output	s15adf.output	\
s15aef.output	s17acf.output	s17adf.output	s17aef.output	\
s17aff.output	s17agf.output	s17ahf.output	s17ajf.output	\
s17akf.output	s17dcf.output	s17def.output	s17dgm.output	\
s17dhf.output	s17dlf.output	s18acf.output	s18adf.output	\
s18aef.output	s18aff.output	s18dcf.output	s18def.output	\
s19aaf.output	s19abf.output	s19acf.output	s19adf.output	\
s20acf.output	s20adf.output	s21baf.output	s21bbf.output	\
s21bcf.output	s21bdf.output	saddle.output	\	
sininv.output	sinsin2.output	sinsin.output	spiral.output	\
tetra.output	tknot.output	tschirn.output	typo.output	\
vectors.output	wester.output	wiggle.output	zimmbron.output	

Error ASEC is invalid as a function.
ASEC=errortrap.output

Error: The function WRAPPED is undefined.
WRAPPED=loop.output

```

# Error: Value stack overflow.
VALUESTACK=tutchap67.output

# Broken at |STAGG-;ELT;AIS;5|. Type :H for Help.
STAGG=reductio.output

# Broken at |GSERIES;INTEGRATE;2$;6|. Type :H for Help.
GSERIES=fixed.output

# never finishes
INFINITELOOP=lextriphk.output

OUTS= ffrac.output      \
      huang.output      \
      intlf.output      \
      lib.output        \
      marcbench.output  \
      synonym2.output   \
      synonym.output    \
      tsetcatbutcher.output tsetcatchemical.output \
      tree.output       \
      tutchap2.output   tutchap3.output   tutchap4.output \
      up.output         \
      vector.output     viewdef.output    \
      wutset.output     \
      xpoly.output      xpr.output        \
      zdsolve.output    zlindep.output

REGRESSTESTS= ackermann.regress \
               algaggr.regress algbrbf.regress algfacob.regress alist.regress \
               allfact.regress antoine.regress \
               arith.regress  array1.regress  array2.regress \
               arrows.regress asinatan.regress asinhatanh.regress \
               assign.regress atansqrt.regress \
               asec.regress   bbtree.regress  bessellk.regress \
               binary.regress bini.regress    biquat.regress \
               bop.regress    bstree.regress  bouquet.regress \
               branchcut.regress \
               bug100.regress bug101.regress \
               bug103.regress bug10069.regress \
               bugs.regress   bug10312.regress bug6357.regress bug9057.regress \
               cachedf.regress calcpob.regress \
               calculus2.regress calculus.regress cardinal.regress card.regress \
               carten.regress  cclass.regress char.regress  ch.regress \
               charlwood.regress cherry.regress \
               chtheorem.regress classtalk.regress clements.regress \
               clifford.regress clif.regress  cmds.regress \
               coerccels.regress collect.regress cohen.regress \
               complex.regress complexfactor.regress conformal.regress \

```


constant.regress	contfrac.regress	contfrc.regress \	
curl.regress	curry.regress	cwmmt.regress \	
cycles1.regress	cycles.regress	cyfactor.regress \	
danzwill.regress	danzwill2.regress	davenport.regress \	
davis.regress \			
decimal.regress	defintef.regress	defintrf.regress \	
derham.regress	derivefail.regress \		
dfloat.regress	dftrig.regress \		
dhmatrix.regress	\		
dhtri.regress	directproduct.regress	distexpr.regress \	
divisor.regress	donsimple.regress \		
dmp.regress	dop.regress	dpol.regress \	
e1.regress	ei.regress \		
easter.regress	efi.regress \		
eigen.regress	elemfun.regress	elemnum.regress	elfuts.regress \
elt.regress	en.regress \		
eq.regress	eqtbl.regress	equation2.regress \	
equation.regress	erf.regress \		
evalex.regress	eval.regress	exdiff.regress \	
exampleagcode.regress \			
exint.regress	exit.regress	exlap.regress	exlimit.regress \
exp.regress	exptest.regress \		
expexpan.regress	explim.regress	expr1.regress	exprode.regress \
expr.regress	exseries.regress	exsum.regress	exprpoly.regress \
farray.regress	ffdemo.regress	fferr.regress	ffieldbug.regress \
ffx72.regress \			
fib.regress	finitegraph.regress \		
file.regress	fixed.regress \		
float1.regress	float2.regress \		
float.regress	fname1.regress	fname.regress	fnla.regress \
fns.regress	fparfrac.regress	fparfrc.regress \	
frame.regress	fr1.regress \		
fr2.regress	frac.regress	fr.regress	free.regress \
function.regress	functioncode.regress \		
galois.regress	gamma.regress \		
gbf.regress	genups.regress	gonshor.regress	grpthry.regress \
gstbl.regress	guess.regress \		
heap.regress	heat.regress	help.regress \	
herm.regress	heugcd.regress \		
hexadec.regress	hyperbolicrules.regress \		
hyperell.regress	ico.regress	ideal.regress \	
ifact.regress	ifthenelse.regress	i2e.regress \	
infprod.regress	intaf.regress	intbypart.regress \	
inputform.regress	intdeq.regress \		
intef2.regress	intef.regress	intg0.regress	intheory.regress \
intmix2.regress	intmix.regress	int.regress	intrf.regress \
iprntpk.regress \			
ipftest.regress	is.regress	isprime.regress \	
kernel.regress	knot2.regress	kovacic.regress	kuipers.regress \
laplace.regress	leg.regress	limit.regress	linalg.regress \

```

lindep.regress      liska.regress      list.regress      liu.regress      \
lode.regress        lodesys.regress    lodo1.regress     \
lodo2.regress        lodo3.regress      lodof.regress      lodo.regress     \
log.regress         \
lpoly.regress        lupfact.regress     lword.regress      macbug.regress   \
machinearithmetic.regress \
macros.regress       magma.regress        manuel.regress      mapleok.regress  \
matbug.regress       mathml.regress      \
matrix1.regress      matrix22.regress    matrix.regress     \
mfinfact.regress     mkfunc.regress      monitortest.regress \
mpoly.regress        mset2.regress      \
mset.regress         multifact.regress    multiple.regress    ndftip.regress   \
negfloats.regress    nepip.regress        newlodo.regress     newton.regress   \
newtonlisp.regress   numericgamma.regress \
nmode.regress        nonlinhomodiffeq.regress \
none.regress         noonburg.regress    noptip.regress     \
nqip.regress         nsfip.regress        numbers.regress     octonion.regress \
oct.regress          ode.regress          odpol.regress       op1.regress      \
opalg.regress         operator.regress     op.regress          ovar.regress     \
overload.regress     padic.regress        paff.regress        paffexample.regress \
parabola.regress     pascal1.regress      pascal.regress      \
patch51.regress      \
patmatch.regress     pat.regress          perman.regress      perm.regress     \
pfaffian.regress     pfr1.regress         pfr.regress         pgcd.regress     \
pmint.regress        polygamma.regress    \
poly1.regress        polycoer.regress     poly.regress        psngenfcn.regress \
quat1.regress        quat.regress          r20abugs.regress    r20bugs.regress  \
r21bugsbig.regress   r21bugs.regress      radff.regress        radix.regress     \
realclos.regress     reclos.regress        reclos2.regress      regset.regress   \
repa6.regress        risch.regress        \
robidoux.regress     \
roman.regress        romanpolynomials.regress \
roots.regress        rsa.regress          \
ruleset.regress      rules.regress        \
rubey.regress        sae.regress          segletes.regress    \
spline.regress       \
scherk.regress        scope.regress         seccsc.regress      \
segbind.regress       seg.regress          \
series2.regress       series.regress        sersolve.regress    set.regress       \
setcmd.regress        shannonmatrix.regress simplify.regress     \
sincos.regress        sinhcosh.regress     \
sincosex.regress     sint.regress          skew.regress         slowint.regress   \
solveperf.regress     \
solvetra.regress      space3.regress        sqmatrix.regress     sqrt3.regress     \
sregset.regress      \
stbl.regress          stream2.regress        stream.regress        streams.regress   \
string.regress        strtbl.regress        subset.regress        summation.regress \
symbol.regress        t111293.regress       table.regress         tancot.regress    \
tanhcoth.regress      tanatan.regress       tbagg.regress         telford.regress   \
test.regress          testpackage.regress   \

```

```

testprob.regress  textfile.regress  torus.regress    tuplebug.regress \
tpiezas001.regress \
tpiezas002.regress tree.regress    trigtests.regress \
triglim.regress   tsetcatvermeer.regress    tutchap1.regress \
typetower.regress void.regress    uniseg.regress \
unittest1.regress unittest2.regress unittest3.regress unittest4.regress \
unit-macro.regress wangeez.regress \
zimmbron.regress  zimmer.regress

```

— regression tests —

```

CATSTESTS= \
  kamke0.regress  kamke1.regress  kamke2.regress  kamke3.regress \
  kamke4.regress  kamke5.regress  kamke6.regress  kamke7.regress \
  schaum1.regress schaum2.regress schaum3.regress schaum4.regress \
  schaum5.regress schaum6.regress schaum7.regress schaum8.regress \
  schaum9.regress schaum10.regress schaum11.regress schaum12.regress \
  schaum13.regress schaum14.regress schaum15.regress schaum16.regress \
  schaum17.regress schaum18.regress schaum19.regress schaum20.regress \
  schaum21.regress schaum22.regress schaum23.regress schaum24.regress \
  schaum25.regress schaum26.regress schaum27.regress schaum28.regress \
  schaum29.regress schaum30.regress schaum31.regress schaum32.regress \
  schaum33.regress schaum34.regress

```

These long-running tests have been split into a different group so we can run them in parallel.

— regression tests —

```

NEWRICHTESTSa= rich1a.regress rich1b.regress rich2.regress \
  rich3a.regress rich3b.regress rich3c.regress \
  rich3d.regress rich3e.regress rich3f.regress \
  rich3g.regress rich3h.regress rich3i.regress \
  rich3j.regress rich3k.regress rich3l.regress \
  rich3m.regress rich3n.regress rich3o.regress \
  rich3p.regress rich3q.regress rich3r.regress \
  rich3s.regress rich3t.regress rich4a.regress \
  rich4b.regress rich4c.regress rich4d.regress \
  rich4e.regress rich4f.regress rich4g.regress \
  rich4h.regress rich4i.regress rich4j.regress \
  rich5.regress  rich6a.regress rich6b.regress \
  rich6c.regress rich6d.regress rich6e.regress \
  rich7.regress  rich8a.regress rich8b.regress \
  rich8c.regress rich8d.regress rich9a.regress \
  rich9b.regress rich10a.regress rich10b.regress \
  rich10c.regress rich10d.regress rich10e.regress \
  rich10f.regress rich11a.regress rich11b.regress \
  rich11c.regress rich11d.regress rich11e.regress \

```

```

richder1a.regress richder1b.regress richder2.regress \
richder3a.regress richder3b.regress richder3c.regress \
richder3d.regress richder3e.regress richder3f.regress \
richder3g.regress richder3h.regress richder3i.regress \
richder3j.regress richder3k.regress richder3l.regress \
richder3m.regress richder3n.regress richder3o.regress \
richder3p.regress richder3q.regress richder3r.regress \
richder3s.regress richder3t.regress richder4a.regress \
richder4b.regress richder4c.regress richder4d.regress \
richder4e.regress richder4f.regress richder5.regress \
richder6a.regress richder6b.regress richder6c.regress \
richder6d.regress richder6e.regress

```

```

NEWRICHTESTS = rich12a.regress rich12b.regress rich12c.regress \
rich12d.regress rich12e.regress rich12f.regress \
richder12a.regress richder12b.regress richder12c.regress \
richder12d.regress richder12e.regress richder12f.regress

```

```

RICHTESTS= \
richalgebraic000-099.regress \
richalgebraic100-199.regress \
richalgebraic200-299.regress \
richalgebraic300-399.regress \
richalgebraic400-461.regress \
richerror000-078.regress \
richexponential.regress \
richhyper000-099.regress \
richhyper100-199.regress \
richhyper200-299.regress \
richhyper300-399.regress \
richhyper400-499.regress \
richhyper500-599.regress \
richhyper600-699.regress \
richhyper700-799.regress \
richhyper800-899.regress \
richhyper900-999.regress \
richhyper1000-1098.regress \
richinvhyper000-099.regress \
richinvhyper100-199.regress \
richintfunc000-032.regress \
richinvtrig000-092.regress \
richlog000-099.regress \
richlog100-199.regress \
richlog200-299.regress \
richlog300-391.regress \
richrational.regress \
richspecfunc000-022.regress \
richtrig000-099.regress \
richtrig100-199.regress \

```

```

    richtrig200-299.regress \
    richtrig300-399.regress \
    richtrig400-499.regress \
    richtrig500-599.regress \
    richtrig600-699.regress \
    richtrig700-799.regress \
    richtrig800-899.regress \
    richtrig900-920.regress

IN=      ${SRC}/input
MID= ${INT}/input
TMPFN=$(shell echo $$RANDOM)

LISPTANGLE=${OBJ}/${SYS}/bin/lisp

all: alltests

algebratests: ${OUTS}
@ echo si13 starting algebra regression testing
@ (cd ${MID} ; \
    ${BOOKS}/tanglec ${SRC}/algebra/Makefile.pamphlet algebra.regress \
    >Makefile.algebra ; \
    ${MAKE} -f Makefile.algebra )
@ echo si14 finished ${INT}/input

newrichtests: ${NEWRICHTESTS} ${OUTS}
@ echo =====
@ echo src/input RUNNING NEW RICH TESTS
@ echo =====

richtests: ${RICHTESTS} ${OUTS}
@ echo =====
@ echo src/input RUNNING RICH TESTS
@ echo =====

catstests: ${CATSTESTS} ${OUTS}
@ echo =====
@ echo src/input RUNNING CATS TESTS
@ echo =====

regresstests: ${REGRESSTESTS} ${OUTS}
@ echo =====
@ echo src/input RUNNING REGRESSION TESTS
@ echo =====

alltests: regresstests catstests newrichtests richtests algebratests ${OUTS}
@ echo =====
@ echo src/input RUNNING ALL TESTS
@ echo =====

```

```

notests:
@ echo =====
@ echo src/input RUNNING NO TESTS
@ echo =====

%.input: ${IN}/%.input.pamphlet
@ echo si15 making ${MID}/${*.input} from ${IN}/${*.input.pamphlet}
@ (cd ${MID} ; \
    echo '(tangle "${IN}/${*.input.pamphlet}" "*" "${*.input}")' | \
    ${LISP} 1>/dev/null 2>/dev/null)

```

The curious use of **egrep** in the pipeline is to remove the spurious differences caused by the Version and Timestamp lines in the standard Axiom banner. These cause mismatches in otherwise identical output.

The input files are not removed because this parallel builds create race conditions.

— regression tests —

```

%.output: %.input
@ echo si16 running test file $* using $*tpd.input
@ echo ')set message test on' > $*tpd.input
@ echo ')set message auto off' >> $*tpd.input
@ echo ')read $*' >> $*tpd.input
@ echo ')lisp (bye)' >> $*tpd.input
@ if [ -z "${NOISE}" ] ; then \
    echo ")read $*tpd.input" | ${TESTSYS} \
        | egrep -v '(Timestamp|Version)' | tee $*.output ; \
else \
    echo ")read $*tpd.input" | ${TESTSYS} \
        | egrep -v '(Timestamp|Version)' > $*.output ; \
fi
# @ rm $*.input

```

A regression test file will run the input file. Each input file specifies that it creates an output file using the `)spool` command. A regression file contains the expected output in specially formatted comments. These output files are run thru the `regress` function which compares the actual results against the expected results.

We need to copy the original pamphlet file to the MID directory because in at least one case (`cwmmmt.regress`) we have `spad` test code in the input file that needs to be extracted and compiled. This is done by commands within the input file itself and uses the built-in `gclweb` function (see `src/interp/gclweb.lisp`)

— regression tests —

```

%.regress: %.input
@ echo si17 regression testing $*
@ (cd ${MID} ; \
    rm -f $*.output ; \

```

```

if [ -z "${NOISE}" ] ; then \
    echo ')read $*.input' | ${TESTSYS} ; \
else \
    echo ')read $*.input' | ${TESTSYS} >${TMP}/trace ; \
fi ; \
if [ -z "${NOISE}" ] ; then \
    echo ')lisp (regress "$*.output")' | ${TESTSYS} \
    | egrep -v '(Timestamp|Version)' | tee $*.regress ; \
else \
    echo ')lisp (regress "$*.output")' | ${TESTSYS} \
    | egrep -v '(Timestamp|Version)' > $*.regress ; \
fi ; \
fgrep "regression result" $*.regress )

```

4 The Makefile

This Makefile will be notangled into the src/input subdirectory.

— * —

```

IN=${SRC}/input
MID=${INT}/input
OUT=${MNT}/${SYS}/input
DOC=${MNT}/${SYS}/doc/src/input

```

```

ASFILES=${OUT}/aseg6.as  ${OUT}/aseg7.as  ${OUT}/ecfact.as \
    ${OUT}/hilbert.as  ${OUT}/matops.as  ${OUT}/pdecomp0.as \
    ${OUT}/romnum.as

```

```

NAGLIB=${OUT}/c02aff.input  ${OUT}/c02agf.input  ${OUT}/c05adf.input \
    ${OUT}/c05nbf.input  ${OUT}/c05pbf.input  ${OUT}/c06eaf.input \
    ${OUT}/c06ebf.input  ${OUT}/c06ecf.input  ${OUT}/c06ekf.input \
    ${OUT}/c06fpf.input  ${OUT}/c06fqf.input  ${OUT}/c06frf.input \
    ${OUT}/c06fuf.input  ${OUT}/c06gbf.input  ${OUT}/c06gcf.input \
    ${OUT}/c06gqf.input  ${OUT}/c06gsf.input  \
    ${OUT}/d01ajf.input  ${OUT}/d01akf.input  ${OUT}/d01alf.input \
    ${OUT}/d01amf.input  ${OUT}/d01anf.input  ${OUT}/d01apf.input \
    ${OUT}/d01aqf.input  ${OUT}/d01asf.input  ${OUT}/d01bbf.input \
    ${OUT}/d01fcf.input  ${OUT}/d01gaf.input  ${OUT}/d01gbf.input \
    ${OUT}/d02bbf.input  ${OUT}/d02bhf.input  ${OUT}/d02cjf.input \
    ${OUT}/d02ejf.input  ${OUT}/d02gaf.input  ${OUT}/d02gbf.input \
    ${OUT}/d02kef.input  ${OUT}/d02raf.input  ${OUT}/d03edf.input \
    ${OUT}/d03eef.input  ${OUT}/d03faf.input  \
    ${OUT}/e01baf.input  ${OUT}/e01bef.input  ${OUT}/e01bff.input \
    ${OUT}/e01bgf.input  ${OUT}/e01bhf.input  ${OUT}/e01daf.input \

```

<code>\${OUT}/e01saf.input</code>	<code>\${OUT}/e01sbf.input</code>	<code>\${OUT}/e01sef.input \</code>
<code>\${OUT}/e01sff.input</code>	<code>\${OUT}/e02adf.input</code>	<code>\${OUT}/e02aef.input \</code>
<code>\${OUT}/e02agf.input</code>	<code>\${OUT}/e02ahf.input</code>	<code>\${OUT}/e02ajf.input \</code>
<code>\${OUT}/e02akf.input</code>	<code>\${OUT}/e02baf.input</code>	<code>\${OUT}/e02bbf.input \</code>
<code>\${OUT}/e02bcf.input</code>	<code>\${OUT}/e02bdf.input</code>	<code>\${OUT}/e02bef.input \</code>
<code>\${OUT}/e02daf.input</code>	<code>\${OUT}/e02dcf.input</code>	<code>\${OUT}/e02ddf.input \</code>
<code>\${OUT}/e02def.input</code>	<code>\${OUT}/e02dff.input</code>	<code>\${OUT}/e02gaf.input \</code>
<code>\${OUT}/e02zaf.input</code>	<code>\${OUT}/e04dgf.input</code>	<code>\${OUT}/e04fdf.input \</code>
<code>\${OUT}/e04gcf.input</code>	<code>\${OUT}/e04jaf.input</code>	<code>\${OUT}/e04mbf.input \</code>
<code>\${OUT}/e04naf.input</code>	<code>\${OUT}/e04ucf.input</code>	<code>\${OUT}/e04ycf.input \</code>
<code>\${OUT}/f01brf.input</code>	<code>\${OUT}/f01bsf.input</code>	<code>\${OUT}/f01maf.input \</code>
<code>\${OUT}/f01mcf.input</code>	<code>\${OUT}/f01qcf.input</code>	<code>\${OUT}/f01qdf.input \</code>
<code>\${OUT}/f01qef.input</code>	<code>\${OUT}/f01rcf.input</code>	<code>\${OUT}/f01rdf.input \</code>
<code>\${OUT}/f01ref.input</code>	<code>\${OUT}/f02aaf.input</code>	<code>\${OUT}/f02abf.input \</code>
<code>\${OUT}/f02adf.input</code>	<code>\${OUT}/f02aef.input</code>	<code>\${OUT}/f02abf.input \</code>
<code>\${OUT}/f02agf.input</code>	<code>\${OUT}/f02ajf.input</code>	<code>\${OUT}/f02akf.input \</code>
<code>\${OUT}/f02awf.input</code>	<code>\${OUT}/f02axf.input</code>	<code>\${OUT}/f02bbf.input \</code>
<code>\${OUT}/f02bjf.input</code>	<code>\${OUT}/f02fjf.input</code>	<code>\${OUT}/f02wef.input \</code>
<code>\${OUT}/f02xef.input</code>	<code>\${OUT}/f04adf.input</code>	<code>\${OUT}/f04arf.input \</code>
<code>\${OUT}/f04asf.input</code>	<code>\${OUT}/f04atf.input</code>	<code>\${OUT}/f04axf.input \</code>
<code>\${OUT}/f04faf.input</code>	<code>\${OUT}/f04jgf.input</code>	<code>\${OUT}/f04maf.input \</code>
<code>\${OUT}/f04mbf.input</code>	<code>\${OUT}/f04mcf.input</code>	<code>\${OUT}/f04qaf.input \</code>
<code>\${OUT}/f07adf.input</code>	<code>\${OUT}/f07aef.input</code>	<code>\${OUT}/f07fdf.input \</code>
<code>\${OUT}/f07fef.input</code>	<code>\</code>	
<code>\${OUT}/s01eaf.input</code>	<code>\${OUT}/s13aaf.input</code>	<code>\${OUT}/s13acf.input \</code>
<code>\${OUT}/s13adf.input</code>	<code>\${OUT}/s14aaf.input</code>	<code>\${OUT}/s14abf.input \</code>
<code>\${OUT}/s14baf.input</code>	<code>\${OUT}/s15adf.input</code>	<code>\${OUT}/s15aef.input \</code>
<code>\${OUT}/s17acf.input</code>	<code>\${OUT}/s17adf.input</code>	<code>\${OUT}/s17aef.input \</code>
<code>\${OUT}/s17aff.input</code>	<code>\${OUT}/s17agf.input</code>	<code>\${OUT}/s17ahf.input \</code>
<code>\${OUT}/s17ajf.input</code>	<code>\${OUT}/s17akf.input</code>	<code>\${OUT}/s17dcf.input \</code>
<code>\${OUT}/s17def.input</code>	<code>\${OUT}/s17dgf.input</code>	<code>\${OUT}/s17dhf.input \</code>
<code>\${OUT}/s17dlf.input</code>	<code>\${OUT}/s18acf.input</code>	<code>\${OUT}/s18adf.input \</code>
<code>\${OUT}/s18aef.input</code>	<code>\${OUT}/s18aff.input</code>	<code>\${OUT}/s18dcf.input \</code>
<code>\${OUT}/s18def.input</code>	<code>\${OUT}/s19aaf.input</code>	<code>\${OUT}/s19abf.input \</code>
<code>\${OUT}/s19acf.input</code>	<code>\${OUT}/s19adf.input</code>	<code>\${OUT}/s20acf.input \</code>
<code>\${OUT}/s20adf.input</code>	<code>\${OUT}/s21baf.input</code>	<code>\${OUT}/s21bbf.input \</code>
<code>\${OUT}/s21bcf.input</code>	<code>\${OUT}/s21bdf.input</code>	

```

FILES= ${OUT}/ackermann.input \
${OUT}/algaggr.input  ${OUT}/algbrbf.input  ${OUT}/algfacob.input \
${OUT}/alist.input    ${OUT}/allfact.input  ${OUT}/antoine.input \
${OUT}/array1.input   ${OUT}/array2.input  ${OUT}/arrows.input \
${OUT}/asinatan.input ${OUT}/asinhatanh.input \
${OUT}/assign.input   ${OUT}/atansqrt.input  ${OUT}/axiom.input \
${OUT}/asec.input \
${OUT}/bbtree.input   ${OUT}/besselk.input \
${OUT}/bern.input \
${OUT}/bernpoly.input ${OUT}/binary.input  ${OUT}/bini.input \
${OUT}/biquat.input   ${OUT}/bop.input \
${OUT}/bouquet.input  ${OUT}/branchcut.input \

```



```

${OUT}/bstree.input    ${OUT}/bug6357.input \
${OUT}/bug9057.input  ${OUT}/bug100.input    ${OUT}/bug101.input \
${OUT}/bug103.input \
${OUT}/bug10069.input ${OUT}/bug10312.input  ${OUT}/cachedf.input \
${OUT}/calcprob.input ${OUT}/calculus.input \
${OUT}/cardinal.input ${OUT}/card.input    ${OUT}/carten.input \
${OUT}/cclass.input   ${OUT}/cdraw.input    ${OUT}/char.input \
${OUT}/ch.input       ${OUT}/charlwood.input ${OUT}/cherry.input \
${OUT}/chtheorem.input ${OUT}/classtalk.input \
${OUT}/clifford.input  ${OUT}/clements.input \
${OUT}/clif.input     ${OUT}/cmds.input \
${OUT}/coercels.input ${OUT}/collect.input  ${OUT}/color.input \
${OUT}/complex.input  ${OUT}/complexfactor.input ${OUT}/cohen.input \
${OUT}/cone.input     ${OUT}/conformal.input \
${OUT}/constant.input \
${OUT}/contfrac.input ${OUT}/contfrac.input  ${OUT}/coordsys.input \
${OUT}/curl.input     ${OUT}/curry.input \
${OUT}/cycles.input   ${OUT}/cycles1.input    ${OUT}/cycloid.input \
${OUT}/cycloid2.input \
${OUT}/cycloid3.input ${OUT}/cyfactor.input  ${OUT}/damped.input \
${OUT}/danzwill1.input ${OUT}/danzwill2.input  ${OUT}/davenport.input \
${OUT}/davis.input    ${OUT}/decimal.input  ${OUT}/defs.input \
${OUT}/defintef.input ${OUT}/defintrf.input  ${OUT}/derham.input \
${OUT}/derivefail.input ${OUT}/de2re.input \
${OUT}/dfloat.input   ${OUT}/dftrig.input   ${OUT}/dhmatrix.input \
${OUT}/dhtri.input    ${OUT}/directproduct.input \
${OUT}/distexpr.input ${OUT}/divisor.input  ${OUT}/donsimple.input \
${OUT}/dmp.input      ${OUT}/dop.input \
${OUT}/dpol.input     ${OUT}/draw2dsf.input \
${OUT}/drawalg.input  ${OUT}/drawcfn.input \
${OUT}/drawcfun.input ${OUT}/drawcurv.input \
${OUT}/draw.input     ${OUT}/drawcx.input    ${OUT}/drawex.input \
${OUT}/drawpoly.input ${OUT}/drawx.input    ${OUT}/e1.input \
${OUT}/ei.input       \
${OUT}/easter.input   ${OUT}/efi.input    ${OUT}/egg.input \
${OUT}/eigen.input \
${OUT}/elemfun.input  ${OUT}/elemnum.input  ${OUT}/elfuts.input \
${OUT}/elt.input      ${OUT}/en.input \
${OUT}/eq.input       ${OUT}/eqtbl.input    ${OUT}/equation.input \
${OUT}/errortrap.input \
${OUT}/eval.input     ${OUT}/exit.input    ${OUT}/exptest.input \
${OUT}/exp.input      ${OUT}/expexpan.input \
${OUT}/explim.input   ${OUT}/expplot2d.input  ${OUT}/expplot3d.input \
${OUT}/expr1.input    ${OUT}/exprpoly.input \
${OUT}/farray.input   ${OUT}/ffdemo.input \
${OUT}/fferr.input    ${OUT}/ffrac.input    ${OUT}/ffieldbug.input \
${OUT}/ffx72.input \
${OUT}/fib.input      ${OUT}/finitegraph.input \
${OUT}/fixed.input \
${OUT}/file.input     ${OUT}/float2.input \

```

<code>\${OUT}/float.input</code>	<code>\${OUT}/float1.input</code>	<code>\${OUT}/fname.input \</code>
<code>\${OUT}/fname1.input</code>	<code>\${OUT}/fnla.input</code>	<code>\${OUT}/folium.input \</code>
<code>\${OUT}/fparfrac.input</code>	<code>\</code>	
<code>\${OUT}/fparfrfc.input</code>	<code>\${OUT}/fr2.input</code>	<code>\${OUT}/frac.input \</code>
<code>\${OUT}/fr.input</code>	<code>\${OUT}/frame.input \</code>	
<code>\${OUT}/fr1.input</code>	<code>\${OUT}/gary1.input \</code>	
<code>\${OUT}/gbf.input</code>	<code>\${OUT}/genups.input</code>	<code>\${OUT}/gnarly1.input \</code>
<code>\${OUT}/gonshor.input</code>	<code>\${OUT}/grdef.input \</code>	
<code>\${OUT}/gstbl.input</code>	<code>\${OUT}/guess.input \</code>	
<code>\${OUT}/heap.input</code>	<code>\${OUT}/heat.input</code>	<code>\${OUT}/helix.input \</code>
<code>\${OUT}/herm.input</code>	<code>\${OUT}/heugcd.input \</code>	
<code>\${OUT}/hexadec.input</code>	<code>\${OUT}/huang.input \</code>	
<code>\${OUT}/hyperbolicrules.input \</code>		
<code>\${OUT}/hyperell.input \</code>		
<code>\${OUT}/ico.input</code>	<code>\${OUT}/ideal.input</code>	<code>\${OUT}/ifact.input \</code>
<code>\${OUT}/ifthenelse.input</code>	<code>\${OUT}/i2e.input \</code>	
<code>\${OUT}/images1.input</code>	<code>\${OUT}/images1a.input</code>	<code>\${OUT}/images3a.input \</code>
<code>\${OUT}/images3.input</code>	<code>\${OUT}/images6.input</code>	<code>\${OUT}/images6a.input \</code>
<code>\${OUT}/images7.input</code>	<code>\${OUT}/images7a.input</code>	<code>\${OUT}/infprod.input \</code>
<code>\${OUT}/inputform.input</code>	<code>\${OUT}/intaf.input</code>	<code>\${OUT}/intbypart.input \</code>
<code>\${OUT}/intdeq.input</code>	<code>\${OUT}/intef.input \</code>	
<code>\${OUT}/intg0.input</code>	<code>\${OUT}/intheory.input</code>	<code>\${OUT}/int.input \</code>
<code>\${OUT}/intl1f.input</code>	<code>\${OUT}/intmix.input</code>	<code>\${OUT}/intrf.input \</code>
<code>\${OUT}/ipftest.input</code>	<code>\${OUT}/is.input</code>	<code>\${OUT}/isprime.input \</code>
<code>\${OUT}/kamke0.input</code>	<code>\${OUT}/kamke1.input \</code>	
<code>\${OUT}/kamke2.input</code>	<code>\${OUT}/kamke3.input</code>	<code>\${OUT}/kamke4.input \</code>
<code>\${OUT}/kamke5.input</code>	<code>\${OUT}/kamke6.input</code>	<code>\${OUT}/kamke7.input \</code>
<code>\${OUT}/kernel.input</code>	<code>\${OUT}/knot.input \</code>	
<code>\${OUT}/kovacic.input</code>	<code>\${OUT}/kuipers.input \</code>	
<code>\${OUT}/laplace.input</code>	<code>\${OUT}/leg.input \</code>	
<code>\${OUT}/lextripk.input</code>	<code>\${OUT}/lib.input</code>	<code>\${OUT}/limit.input \</code>
<code>\${OUT}/linalg.input \</code>		
<code>\${OUT}/lindep.input</code>	<code>\${OUT}/liska.input \</code>	
<code>\${OUT}/liss1.input</code>	<code>\${OUT}/liss2.input \</code>	
<code>\${OUT}/list.input</code>	<code>\${OUT}/liu.input \</code>	
<code>\${OUT}/lode.input</code>	<code>\${OUT}/lodesys.input \</code>	
<code>\${OUT}/lodo1.input</code>	<code>\${OUT}/lodo2.input</code>	<code>\${OUT}/lodof.input \</code>
<code>\${OUT}/lodo.input</code>	<code>\${OUT}/lodo3.input</code>	<code>\${OUT}/log.input \</code>
<code>\${OUT}/lpoly.input</code>	<code>\${OUT}/lump.input \</code>	
<code>\${OUT}/lupfact.input</code>	<code>\${OUT}/lword.input</code>	<code>\${OUT}/macbug.input \</code>
<code>\${OUT}/machinearithmetic.input \</code>		
<code>\${OUT}/macros.input</code>	<code>\${OUT}/marchbench.input</code>	<code>\${OUT}/magma.input \</code>
<code>\${OUT}/manuel.input</code>	<code>\${OUT}/mapleok.input</code>	<code>\${OUT}/matbug.input \</code>
<code>\${OUT}/mathml.input \</code>		
<code>\${OUT}/matrix22.input</code>	<code>\${OUT}/matrix.input</code>	<code>\${OUT}/matrix1.input \</code>
<code>\${OUT}/mfinfact.input</code>	<code>\${OUT}/mkfunc.input</code>	<code>\${OUT}/monitortest.input \</code>
<code>\${OUT}/mountain.input \</code>		
<code>\${OUT}/mpoly.input</code>	<code>\${OUT}/mset.input</code>	<code>\${OUT}/mset2.input \</code>
<code>\${OUT}/multfact.input</code>	<code>\${OUT}/multknot.input</code>	<code>\${OUT}/mult3d.input \</code>
<code>\${OUT}/multiple.input \</code>		

```

${OUT}/ndftip.input    ${OUT}/newlodo.input \
${OUT}/negfloats.input \
${OUT}/nepip.input     ${OUT}/newton.input  ${OUT}/newtonlisp.input \
${OUT}/numericgamma.input ${OUT}/nonlinhomodiffeq.input \
${OUT}/nnode.input     ${OUT}/none.input    ${OUT}/noonburg.input \
${OUT}/noptip.input    ${OUT}/nqip.input    ${OUT}/nsfip.input \
${OUT}/ntube.input     ${OUT}/oct.input     ${OUT}/ode.input \
${OUT}/octonion.input  ${OUT}/odpol.input \
${OUT}/opalg.input     ${OUT}/operator.input ${OUT}/op.input \
${OUT}/op1.input       ${OUT}/ovar.input    ${OUT}/overload.input \
${OUT}/padic.input     ${OUT}/paff.input     ${OUT}/paffexample.input \
${OUT}/palette.input \
${OUT}/parpcurv.input  ${OUT}/parscurv.input  ${OUT}/parsurf.input \
${OUT}/pascal1.input \
${OUT}/pascal.input   \
${OUT}/patch51.input \
${OUT}/patmatch.input ${OUT}/perman.input \
${OUT}/perm.input      ${OUT}/pfaffian.input \
${OUT}/pfr.input       ${OUT}/pfr1.input    ${OUT}/pgcd.input \
${OUT}/pinch.input     ${OUT}/plotfile.input  ${OUT}/pollevel.input \
${OUT}/pmin1.input     ${OUT}/polygamma.input  ${OUT}/polycoer.input \
${OUT}/poly1.input     ${OUT}/psgenfcn.input \
${OUT}/quat.input      ${OUT}/quat1.input    ${OUT}/ribbon.input \
${OUT}/ribbons.input   ${OUT}/ribbonsnew.input \
${OUT}/rich1a.input    ${OUT}/rich1b.input \
${OUT}/rich2.input     ${OUT}/rich3a.input    ${OUT}/rich3b.input \
${OUT}/rich3c.input    ${OUT}/rich3d.input    ${OUT}/rich3e.input \
${OUT}/rich3f.input    ${OUT}/rich3g.input    ${OUT}/rich3h.input \
${OUT}/rich3i.input    ${OUT}/rich3j.input    ${OUT}/rich3k.input \
${OUT}/rich3l.input    ${OUT}/rich3m.input    ${OUT}/rich3n.input \
${OUT}/rich3o.input    ${OUT}/rich3p.input    ${OUT}/rich3q.input \
${OUT}/rich3r.input    ${OUT}/rich3s.input    ${OUT}/rich3t.input \
${OUT}/rich4a.input    ${OUT}/rich4b.input    ${OUT}/rich4c.input \
${OUT}/rich4d.input    ${OUT}/rich4e.input    ${OUT}/rich4f.input \
${OUT}/rich4g.input    ${OUT}/rich4h.input    ${OUT}/rich4i.input \
${OUT}/rich4j.input    ${OUT}/rich5.input     ${OUT}/rich6a.input \
${OUT}/rich6b.input    ${OUT}/rich6c.input    ${OUT}/rich6d.input \
${OUT}/rich6e.input    \
${OUT}/rich7.input     ${OUT}/rich8a.input  ${OUT}/rich8b.input \
${OUT}/rich8c.input    ${OUT}/rich8d.input  ${OUT}/rich9a.input \
${OUT}/rich9b.input \
${OUT}/rich10a.input   ${OUT}/rich10b.input \
${OUT}/rich10c.input   ${OUT}/rich10d.input \
${OUT}/rich10e.input   ${OUT}/rich10f.input \
${OUT}/rich11a.input   ${OUT}/rich11b.input \
${OUT}/rich11c.input   ${OUT}/rich11d.input \
${OUT}/rich11e.input \
${OUT}/rich12a.input   ${OUT}/rich12b.input \
${OUT}/rich12c.input   ${OUT}/rich12d.input \
${OUT}/rich12e.input   ${OUT}/rich12f.input \

```

```

${OUT}/richder1a.input ${OUT}/richder1b.input \
${OUT}/richder2.input  ${OUT}/richder3a.input \
${OUT}/richder3b.input ${OUT}/richder3c.input \
${OUT}/richder3d.input ${OUT}/richder3e.input \
${OUT}/richder3f.input ${OUT}/richder3g.input \
${OUT}/richder3h.input ${OUT}/richder3i.input \
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FILES2=${OUT}/arith.input  ${OUT}/bugs.input \
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${OUT}/exlimit.input \
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${OUT}/exsum.input   ${OUT}/fns.input      \
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${OUT}/galois.input  ${OUT}/gamma.input \
${OUT}/grpthry.input \
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${OUT}/intmix2.input  ${OUT}/knot2.input    ${OUT}/linalg.input \

```

```

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${OUT}/parabola.input ${OUT}/pat.input \
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```

```

RICHINPUT= \
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  ${OUT}/richalgebraic300-399.input \
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  ${OUT}/richerror000-078.input \
  ${OUT}/richexponential.input \
  ${OUT}/richhyper000-099.input \
  ${OUT}/richhyper100-199.input \
  ${OUT}/richhyper200-299.input \
  ${OUT}/richhyper300-399.input \
  ${OUT}/richhyper400-499.input \
  ${OUT}/richhyper500-599.input \
  ${OUT}/richhyper600-699.input \
  ${OUT}/richhyper700-799.input \
  ${OUT}/richhyper800-899.input \
  ${OUT}/richhyper900-999.input \
  ${OUT}/richhyper1000-1098.input \
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  ${OUT}/richinvtrig000-092.input \
  ${OUT}/richlog000-099.input \
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  ${OUT}/richtrig000-099.input \
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  ${OUT}/richtrig400-499.input \
  ${OUT}/richtrig500-599.input \
  ${OUT}/richtrig600-699.input \
  ${OUT}/richtrig700-799.input \
  ${OUT}/richtrig800-899.input \
  ${OUT}/richtrig900-920.input

```

```

BROKEN=${OUT}/as-eg1.input  ${OUT}/as-eg2.input  ${OUT}/as-eg3.input \
      ${OUT}/as-eg4.input  ${OUT}/as-eg5.input  ${OUT}/as-eg6.input

```

```

# This viewport has already been closed!
VIEWPORT=${OUT}/graphics.input

# Error: Value stack overflow.
VALUESTACK=${OUT}/images2a.input ${OUT}/images2.input ${OUT}/images5a.input \
          ${OUT}/images5.input ${OUT}/images8a.input ${OUT}/images8.input \
          ${OUT}/mult2d.input ${OUT}/plotlist.input

# documented test cases
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  ${DOC}/allfact.input.dvi     ${DOC}/antoine.input.dvi     \
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  ${DOC}/array2.input.dvi      ${DOC}/arrows.input.dvi        \
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  ${DOC}/as-eg3.input.dvi      ${DOC}/as-eg4.input.dvi        \
  ${DOC}/as-eg5.input.dvi      ${DOC}/aseg6.as.dvi           \
  ${DOC}/as-eg6.input.dvi      ${DOC}/aseg7.as.dvi           \
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  ${DOC}/c06ebf.input.dvi      ${DOC}/c06ecf.input.dvi      \
  ${DOC}/c06ekf.input.dvi      ${DOC}/c06fpf.input.dvi      \
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  ${DOC}/c06fuf.input.dvi      ${DOC}/c06gbf.input.dvi      \
  ${DOC}/c06gcf.input.dvi      ${DOC}/c06gqf.input.dvi      \
  ${DOC}/c06gsf.input.dvi      ${DOC}/cachedf.input.dvi      \
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${DOC}/s13acf.input.dvi       ${DOC}/s13adf.input.dvi \
${DOC}/s14aaf.input.dvi       ${DOC}/s14abf.input.dvi \
${DOC}/s14baf.input.dvi       ${DOC}/s15adf.input.dvi \
${DOC}/s15aef.input.dvi       ${DOC}/s17acf.input.dvi \
${DOC}/s17adf.input.dvi       ${DOC}/s17aef.input.dvi \
${DOC}/s17aff.input.dvi       ${DOC}/s17agf.input.dvi \
${DOC}/s17ahf.input.dvi       ${DOC}/s17ajf.input.dvi \
${DOC}/s17akf.input.dvi       ${DOC}/s17dcf.input.dvi \

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<code>\${DOC}/s17def.input.dvi</code>	<code>\${DOC}/s17dgm.input.dvi</code>	<code>\</code>
<code>\${DOC}/s17dhf.input.dvi</code>	<code>\${DOC}/s17dlf.input.dvi</code>	<code>\</code>
<code>\${DOC}/s18acf.input.dvi</code>	<code>\${DOC}/s18adf.input.dvi</code>	<code>\</code>
<code>\${DOC}/s18aef.input.dvi</code>	<code>\${DOC}/s18aff.input.dvi</code>	<code>\</code>
<code>\${DOC}/s18dcf.input.dvi</code>	<code>\${DOC}/s18def.input.dvi</code>	<code>\</code>
<code>\${DOC}/s19aaf.input.dvi</code>	<code>\${DOC}/s19abf.input.dvi</code>	<code>\</code>
<code>\${DOC}/s19acf.input.dvi</code>	<code>\${DOC}/s19adf.input.dvi</code>	<code>\</code>
<code>\${DOC}/s20acf.input.dvi</code>	<code>\${DOC}/s20adf.input.dvi</code>	<code>\</code>
<code>\${DOC}/s21baf.input.dvi</code>	<code>\${DOC}/s21bbf.input.dvi</code>	<code>\</code>
<code>\${DOC}/s21bcf.input.dvi</code>	<code>\${DOC}/s21bdf.input.dvi</code>	<code>\</code>
<code>\${DOC}/saddle.input.dvi</code>	<code>\${DOC}/scherk.input.dvi</code>	<code>\</code>
<code>\${DOC}/scope.input.dvi</code>	<code>\${DOC}/seccsc.input.dvi</code>	<code>\</code>
<code>\${DOC}/segbind.input.dvi</code>	<code>\</code>	
<code>\${DOC}/seg.input.dvi</code>	<code>\${DOC}/series2.input.dvi</code>	<code>\</code>
<code>\${DOC}/series.input.dvi</code>	<code>\${DOC}/sersolve.input.dvi</code>	<code>\</code>
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<code>\${DOC}/shannonmatrix.input.dvi</code>	<code>\${DOC}/simplify.input.dvi</code>	<code>\</code>
<code>\${DOC}/sincos.input.dvi</code>	<code>\</code>	
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<code>\${DOC}/sininv.input.dvi</code>	<code>\${DOC}/sinsin2.input.dvi</code>	<code>\</code>
<code>\${DOC}/sinsin.input.dvi</code>	<code>\${DOC}/sint.input.dvi</code>	<code>\</code>
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<code>\${DOC}/solveperf.input.dvi</code>	<code>\</code>	
<code>\${DOC}/solvetra.input.dvi</code>	<code>\${DOC}/space3.input.dvi</code>	<code>\</code>
<code>\${DOC}/spadprof.input.dvi</code>	<code>\${DOC}/spiral.input.dvi</code>	<code>\</code>
<code>\${DOC}/sqmatrix.input.dvi</code>	<code>\${DOC}/sqrt3.input.dvi</code>	<code>\</code>
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<code>\${DOC}/table.input.dvi</code>	<code>\${DOC}/tanatan.input.dvi</code>	<code>\</code>
<code>\${DOC}/tancot.input.dvi</code>	<code>\${DOC}/tanhcoth.input.dvi</code>	<code>\</code>
<code>\${DOC}/tbagg.input.dvi</code>	<code>\${DOC}/telford.input.dvi</code>	<code>\</code>
<code>\${DOC}/test.input.dvi</code>	<code>\${DOC}/tetra.input.dvi</code>	<code>\</code>
<code>\${DOC}/textfile.input.dvi</code>	<code>\${DOC}/tknot.input.dvi</code>	<code>\</code>
<code>\${DOC}/torus.input.dvi</code>	<code>\${DOC}/testpackage.input.dvi</code>	<code>\</code>
<code>\${DOC}/testprob.input.dvi</code>	<code>\</code>	
<code>\${DOC}/tpiezas001.input.dvi</code>	<code>\</code>	
<code>\${DOC}/tpiezas002.input.dvi</code>	<code>\</code>	
<code>\${DOC}/tree.input.dvi</code>	<code>\${DOC}/trigtests.input.dvi</code>	<code>\</code>
<code>\${DOC}/triglim.input.dvi</code>	<code>\${DOC}/tschirn.input.dvi</code>	<code>\</code>
<code>\${DOC}/tsetcatbutcher.input.dvi</code>	<code>\</code>	
<code>\${DOC}/tsetcatchemical.input.dvi</code>	<code>\</code>	
<code>\${DOC}/tsetcatvermeer.input.dvi</code>	<code>\</code>	
<code>\${DOC}/tuplebug.input.dvi</code>	<code>\</code>	
<code>\${DOC}/tutchap1.input.dvi</code>	<code>\${DOC}/tutchap2.input.dvi</code>	<code>\</code>
<code>\${DOC}/tutchap3.input.dvi</code>	<code>\${DOC}/tutchap4.input.dvi</code>	<code>\</code>

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    ${DOC}/tutchap67.input.dvi    ${DOC}/typetower.input.dvi  \
    ${DOC}/typo.input.dvi        \
    ${DOC}/uniseg.input.dvi      \
    ${DOC}/up.input.dvi          \
    ${DOC}/vector.input.dvi      ${DOC}/vectors.input.dvi    \
    ${DOC}/viewdef.input.dvi     ${DOC}/void.input.dvi      \
    ${DOC}/wester.input.dvi      ${DOC}/wiggle.input.dvi     \
    ${DOC}/wutset.input.dvi      \
    ${DOC}/xpoly.input.dvi       ${DOC}/xpr.input.dvi         \
    ${DOC}/wangeez.input.dvi     ${DOC}/zimmbron.input.dvi   \
    ${DOC}/zdsolve.input.dvi     ${DOC}/zimmer.input.dvi     \
    ${DOC}/zlindep.input.dvi

all: ${FILES} ${FILES2} ${ASFILES} ${RICHINPUT} regress ${DOCFILES}
@echo 1 finished ${IN}

\getchunk{genericRules}

use:
@echo si18 making ${OUT} from ${IN}

regress:
@echo si19 making ${MID}
@ ${BOOKS}/tanglec ${IN}/Makefile.pamphlet "regression tests" \
    >${MID}/Makefile
@ echo 3a tpdhere parallel making ${MID}
@ echo 3b tpdhere parallel making ${MID}
( cd ${MID}; ${ENV} ${MAKE} ${TESTSET} )

bug:
@echo si20 making ${OUT} from ${IN}

document:
@echo si21 documenting ${OUT}

clean:
@echo si22 cleaning ${MID}
@rm -rf ${MID}
@echo si23 cleaning ${OUT}
@rm -rf ${OUT}
@rm -f Makefile Makefile.dvi

```

References

- [1] nothing