

# **The Cygnus C Math Library**

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libm 1.4  
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Libm

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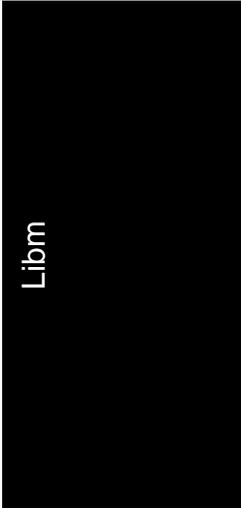
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## 1 Reentrancy Properties of libm

When a math function detects an error, it sets the static variable `errno`. Depending upon the severity of the error, it may also print a message to `stderr`. None of this behavior is reentrant. When one process detects an error, it sets `errno`. If another process is testing `errno`, it detects the change and probably fails. Note that failing system calls can also set `errno`. This problem can only be fixed by either ignoring `errno`, or treating it as part of the context of a process and switching it along with the rest of a processor state. In normal debugged programs, there are usually no math subroutine errors—and therefore no `matherr` calls; in that situation, the math functions behave reentrantly.

As an alternative, you can use the reentrant versions of the mathematical functions: these versions have a different name, normally formed by prepending ‘\_’ and appending ‘\_r’, and use an extra argument—a pointer to the particular reentrancy structure to use. See section “Reentrancy” in *The Cygnus C Support Library*, for more discussion of this approach to reentrancy.

The reentrancy structure is always an additional first argument; for example, the reentrant version of ‘double `acos` (double `x`)’ is ‘double `_acos_r` (void \*`reent`, double `x`)’.

Here is a list of the names for reentrant versions of the mathematical library functions:

<code>_acos_r</code>	<code>_gammaf_r_r</code>	<code>_log10f_r</code>
<code>_acosf_r</code>	<code>_hypot_r</code>	<code>_log_r</code>
<code>_acosh_r</code>	<code>_hypotf_r</code>	<code>_logf_r</code>
<code>_acoshf_r</code>	<code>_j0_r</code>	<code>_pow_r</code>
<code>_asin_r</code>	<code>_j0f_r</code>	<code>_powf_r</code>
<code>_asinf_r</code>	<code>_j1_r</code>	<code>_remainder_r</code>
<code>_atanh_r</code>	<code>_j1f_r</code>	<code>_sinh_r</code>
<code>_atanhf_r</code>	<code>_jn_r</code>	<code>_sinhf_r</code>
<code>_cosh_r</code>	<code>_jnf_r</code>	<code>_sqrt_r</code>
<code>_coshf_r</code>	<code>_ldexp_r</code>	<code>_sqrtf_r</code>
<code>_exp_r</code>	<code>_ldexpf_r</code>	<code>_y0_r</code>
<code>_expf_r</code>	<code>_lgamma_r</code>	<code>_y0f_r</code>
<code>_fmod_r</code>	<code>_lgamma_r_r</code>	<code>_y1_r</code>
<code>_fmodf_r</code>	<code>_lgammaf_r</code>	<code>_y1f_r</code>
<code>_gamma_r</code>	<code>_lgammaf_r_r</code>	<code>_yn_r</code>
<code>_gamma_r_r</code>	<code>_log10_r</code>	<code>_ynf_r</code>
<code>_gammaf_r</code>		



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*pncr<sub>i</sub> at 10.95pt* and  
*pcr<sub>ro</sub>*  
are used for emphasis.