Subject: Looking for Mittag-Leffler function
Posted by mzkiss on Wed, 11 Feb 2004 16:28:50 GMT
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Hi everyone! I am trying to write a code which will generate the Mittag-Leffler function,

E_alpha(x) = sum(k = 0 to infinity) (x^k)/gamma(alpha*k + 1).

There are more general cases, but in this particular application, x is real, and alpha is between 0 and 1. Oh, and as a special case, if alpha = 1, then this reduces to exp(x). My problem is that coding it up as is works up to a point before reaching machine limits (x^k for large x and large k, as well as large values of the gamma function), but I need solutions for large x (x >= 20).

Can anyone point me in the right direction?

Thanks,
Mik Kiss

Subject: Re: Looking for Mittag-Leffler function
Posted by mzkiss on Fri, 13 Feb 2004 19:44:50 GMT
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Sure! The subject is viscoelasticity of solids. In one particular viscoelastic model, the stress is a function of the strain and strain rate. Well, a modified version of this model replaces the strain rate with a fractional derivative (with the fraction between 0 and 1). So, if the solid is subjected to an impulse stress, according to the model, the creep compliance solution is a Mittag-Leffler function. This is a bit glossed over, but it's the guts of the problem.
Mik Kiss

meinel@aero.org (Ed Meinel) wrote in message news:<63342373.0402130651.4206d1b8@posting.google.com>...
>> mzkiss@wisc.edu (Miklos Kiss) writes:
>>> Hi everyone! I am trying to write a code which will generate the
>>> Mittag-Leffler function,
>>>
>
> Wow, I haven't heard anyone say "Mittag-Leffler" since my days in
> graduate school! Could you tell us what you are using them for?
>
> Ed Meinel