Correction for: Interpolating function with two important characteristics

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- *Date*: 19 Oct 2005 12:17:48 GMT

[sorry, I have to correct myself: I didn't mean first−derivative,
but second!]

Hello!
I need an interpolating function Y=Func(Array,X) with these
characteristics:

1) Passes through the points.
2) At least the SECOND−derivative must be continuos, thus the
first−derivative must be "smooth", with no abrupt, sudden changes
in slope.

As far as I know Catmull−Rom doesn't satisfy the 2nd point, and
many other spline−like functions don't satisfy the 1st point.

Ideally, a third point would be that if the array contains a
repeating pattern of 0,1,0,−1 then it should produce a sinewave.
It should produce a sine−like wave also if the repeating pattern
is e.g. 1,−1 or 0,.707,1,.707,0,−.707,−1,−.707

Is it even mathematically possible? Should I give up? Or what
should I Google for? :P

PS: yes, I thought too about the Sinc() interpolation.. but how
long should the window be to give decent (= ~ 1% error) results?
Also, what kind of windowing function should I use? Probably not
rectangular, I reckon.

It is for generical data, not for audio or video. Generical data may
mean control data for robotic arms, etc.. I know that B−spline and
others are used everyday for this task, it was just an example, but
anyway I'd like this function, when implemented in 2D, to e.g. produce
a circle if I use 3 points (which if linearly interpolated would make
a triangle); if I use 4 points (which if linearly interpolated would
make a square) it should, interpolated, produce a circle too; if I
use 8 points (which if linearly interpolated would make an octagon)
it should, interpolated, produce again a circle, etc.. that's why I

wanted the 1D case to produce sinewaves. I know, that leads me auto−
magically to sinc() interpolation.. hmm.

Many thanks,
Mike

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