Fourier series

Classical formula:

where

Lanczos formula:

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# 

## Classical formula

For ,

*Fourier series*

For ,

*Fourier series*

This emphasizes that Fourier series coefficients depend on the domain over which the series is valid, a well-known property of Fourier series. In the proposed approach, this has a profound effect—the function expansion coefficients, the in Eqn. (XX), must be recalculated if the domain of the series expansion changes.

## Lanczos formula

For ,

For ,

This is noticeably different than

# 

## Classical formula

For , , cannot have values <0 or the root square would result in terms

For ,

Integrating by parts

*, , ,*

Integrating by parts another time

*, , ,*

Back to the 1st integration by parts

Back to the original:

Integrating by parts

*, , ,*

Integrating by parts another time

*, , ,*

Back to the 1st integration by parts

Back to the original:

*Fourier series:*

If we ignore the integrals then the series would be:

## Lanczos formula

For ,

Integrating by parts

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Integrating by parts another time

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