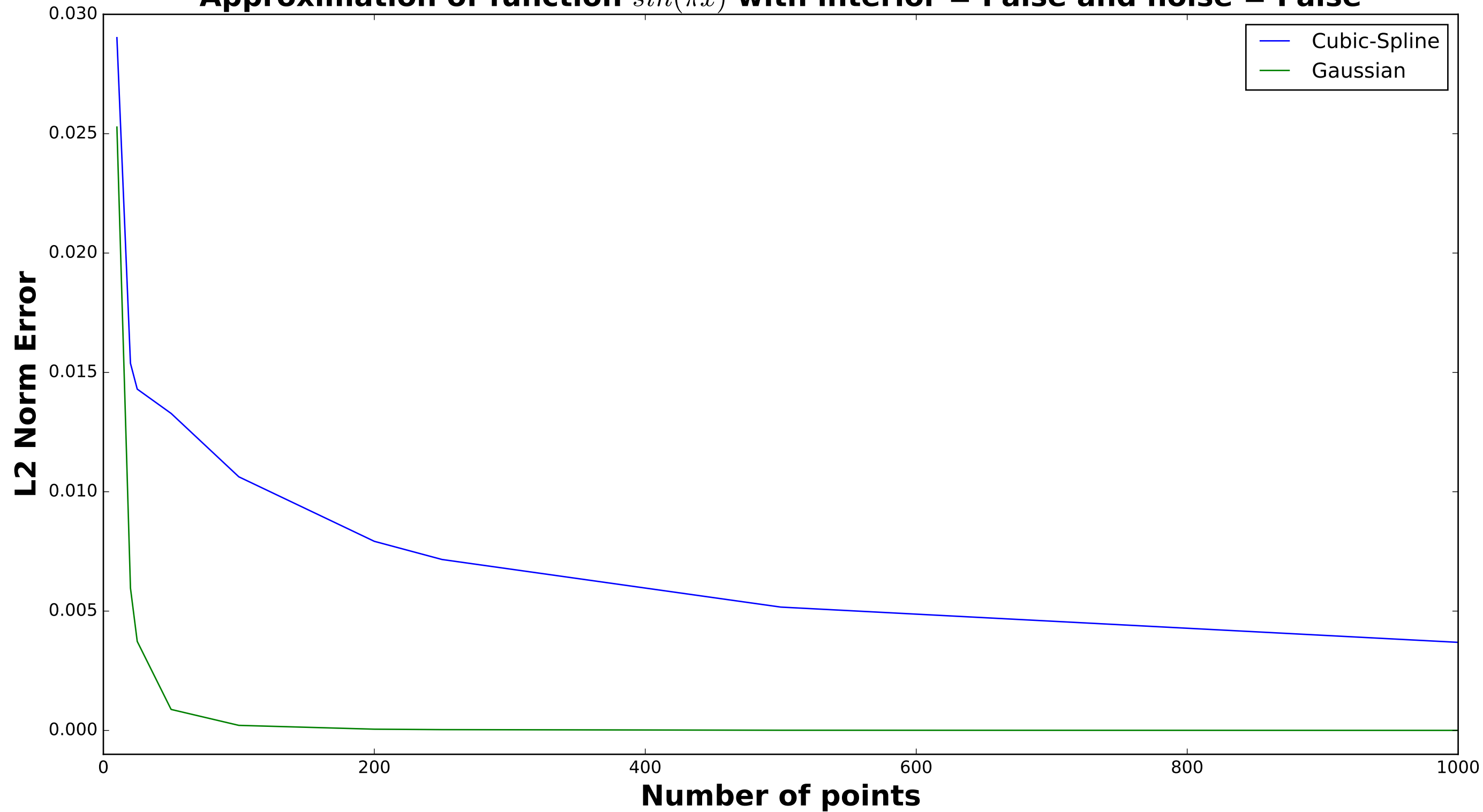
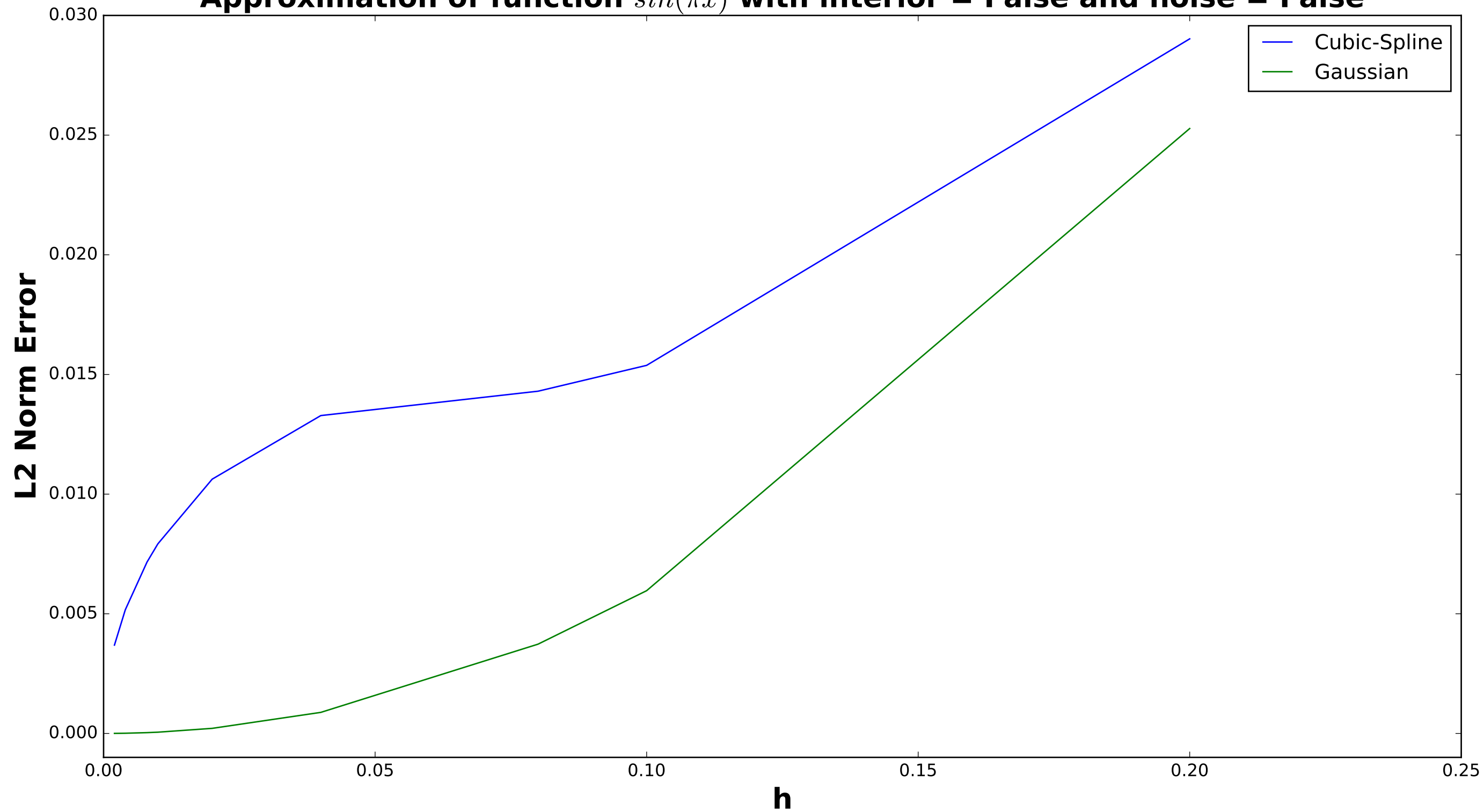


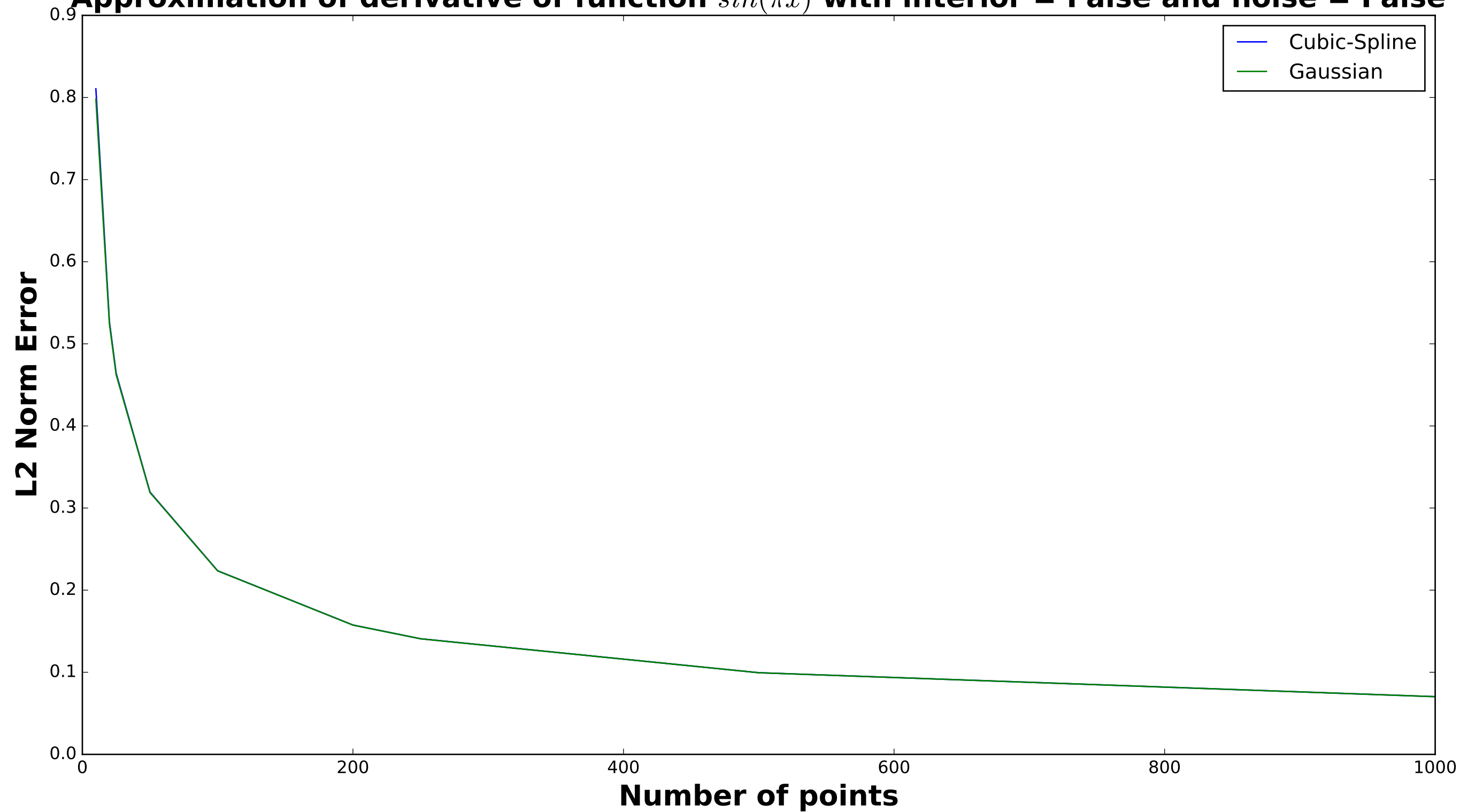
Approximation of function $\sin(\pi x)$ with interior = False and noise = False



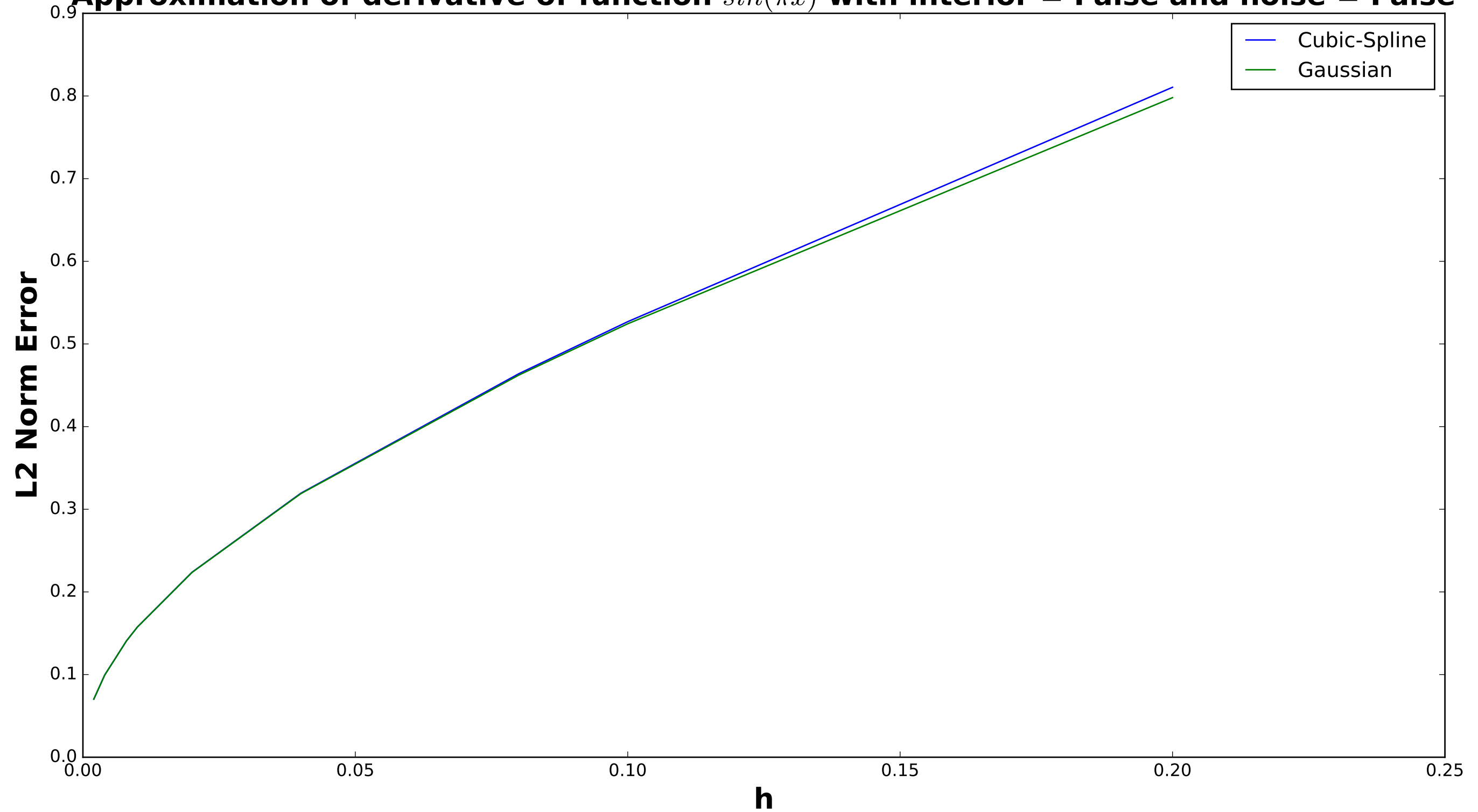
Approximation of function $\sin(\pi x)$ with interior = False and noise = False



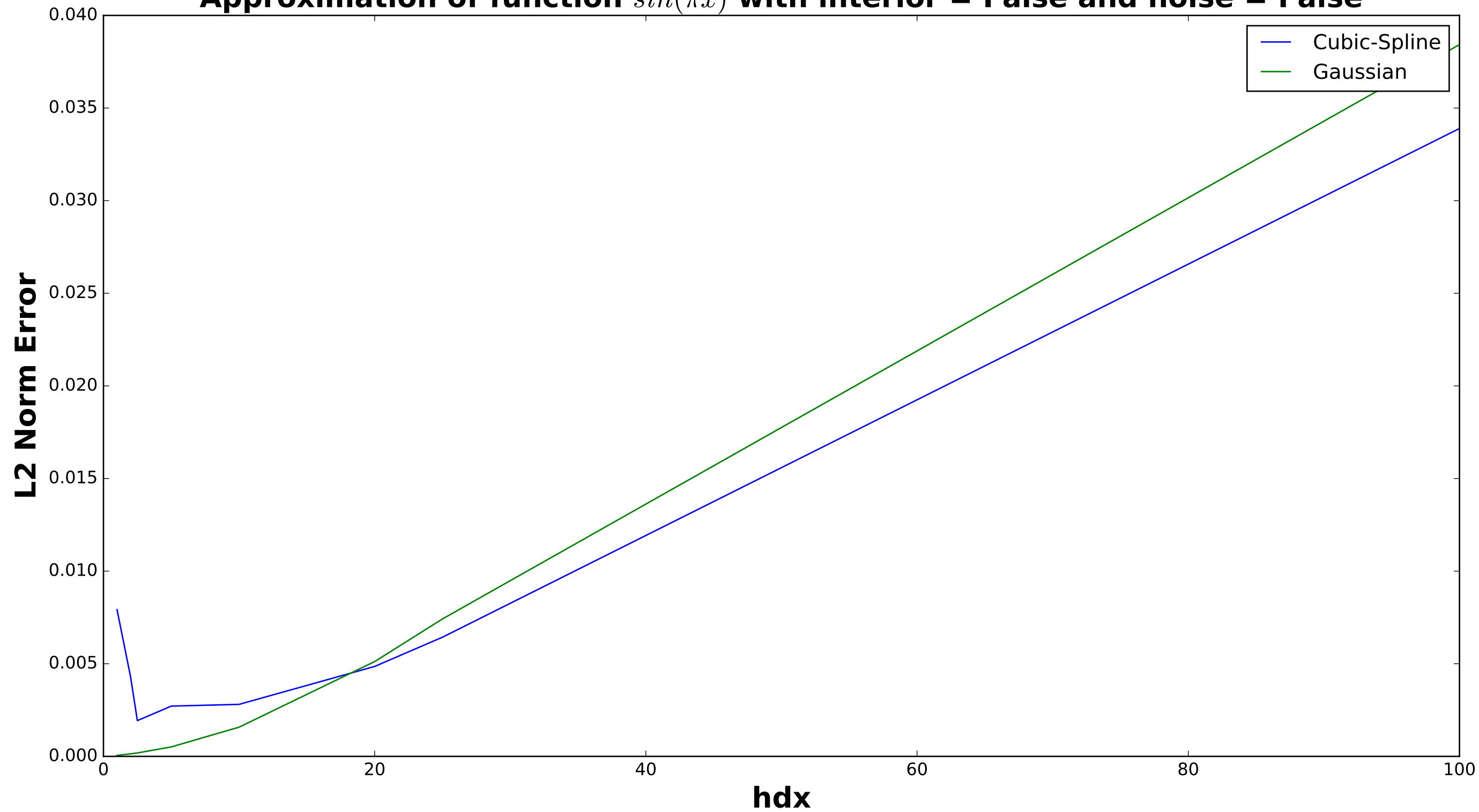
Approximation of derivative of function $\sin(\pi x)$ with interior = False and noise = False



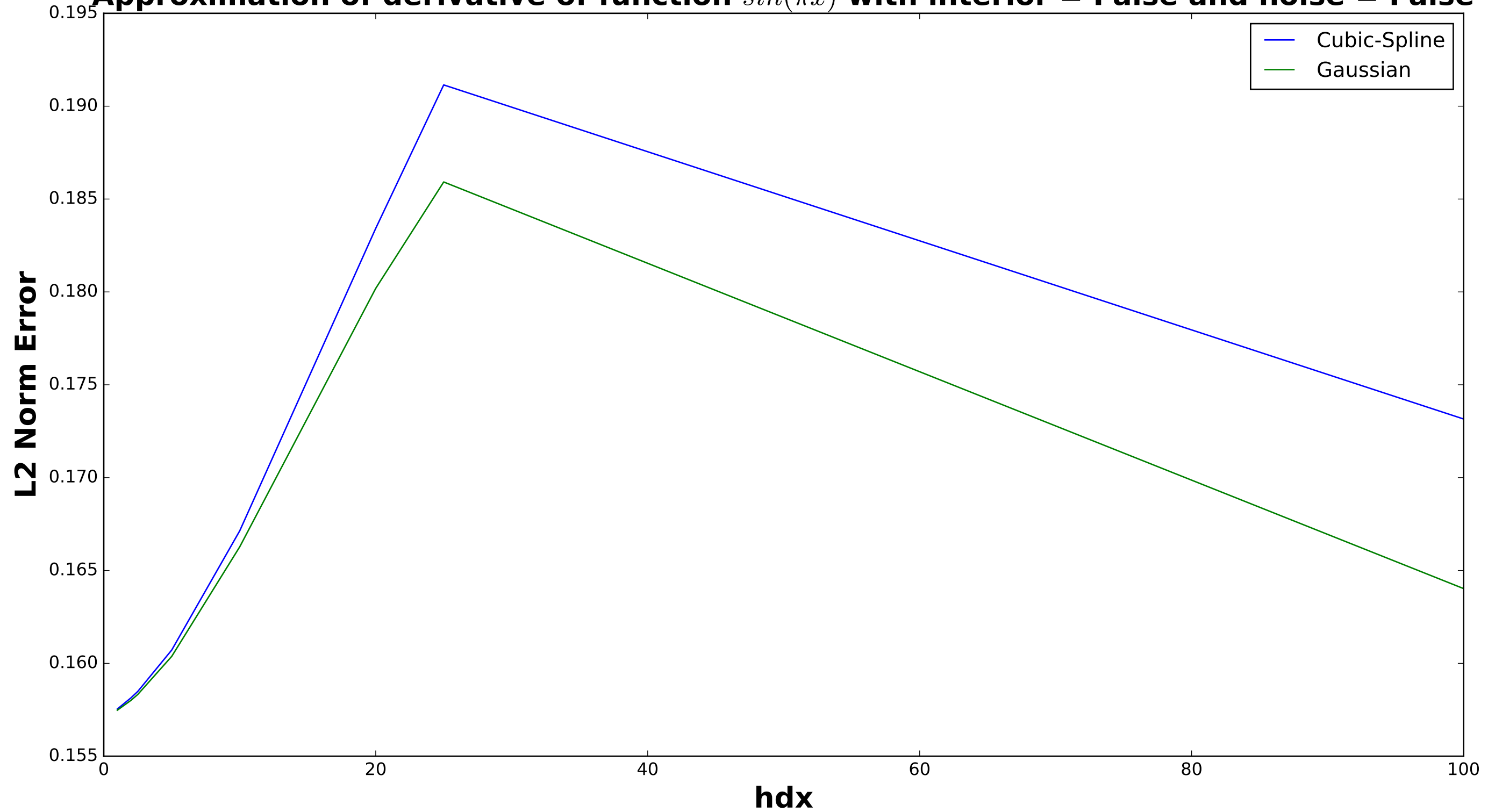
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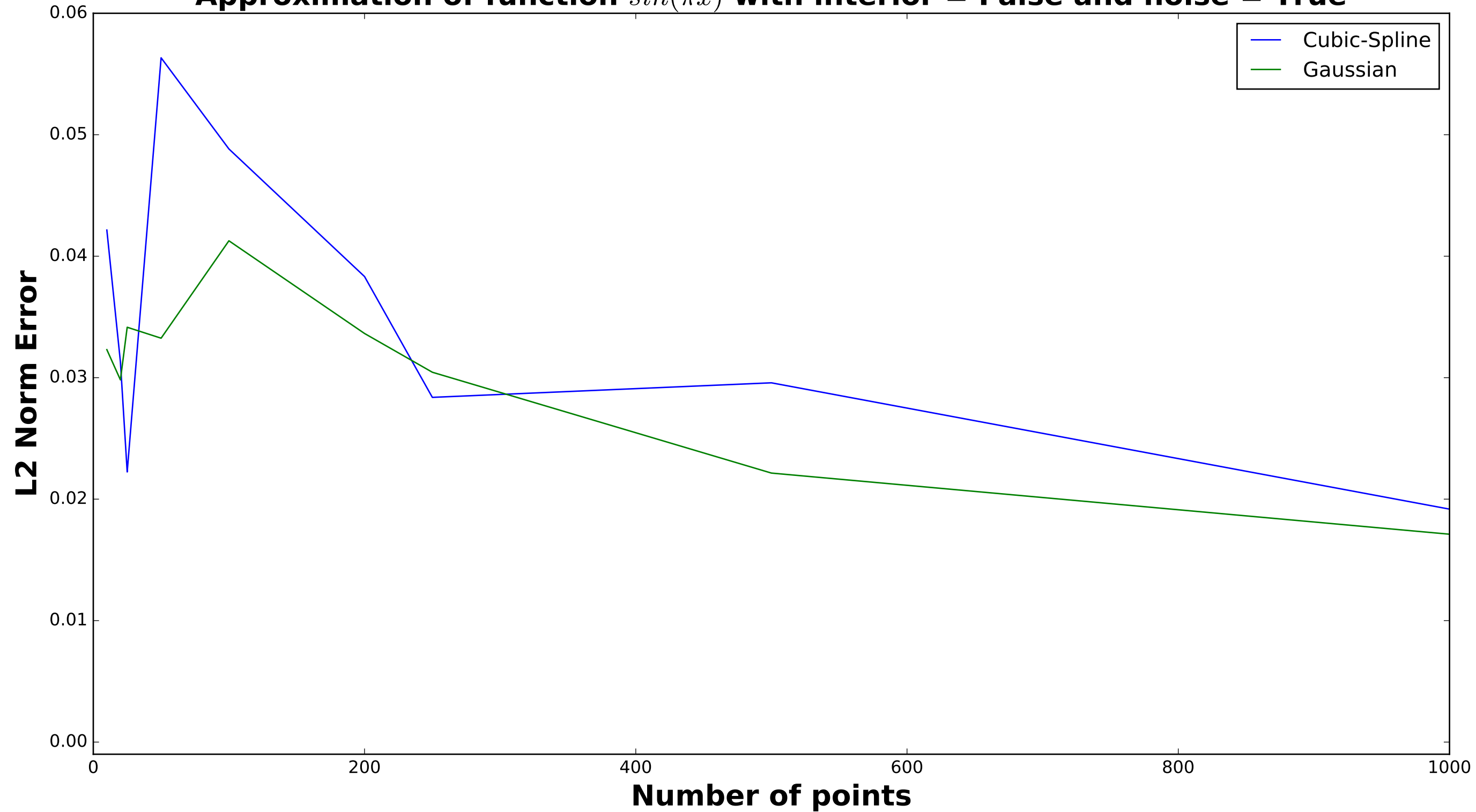
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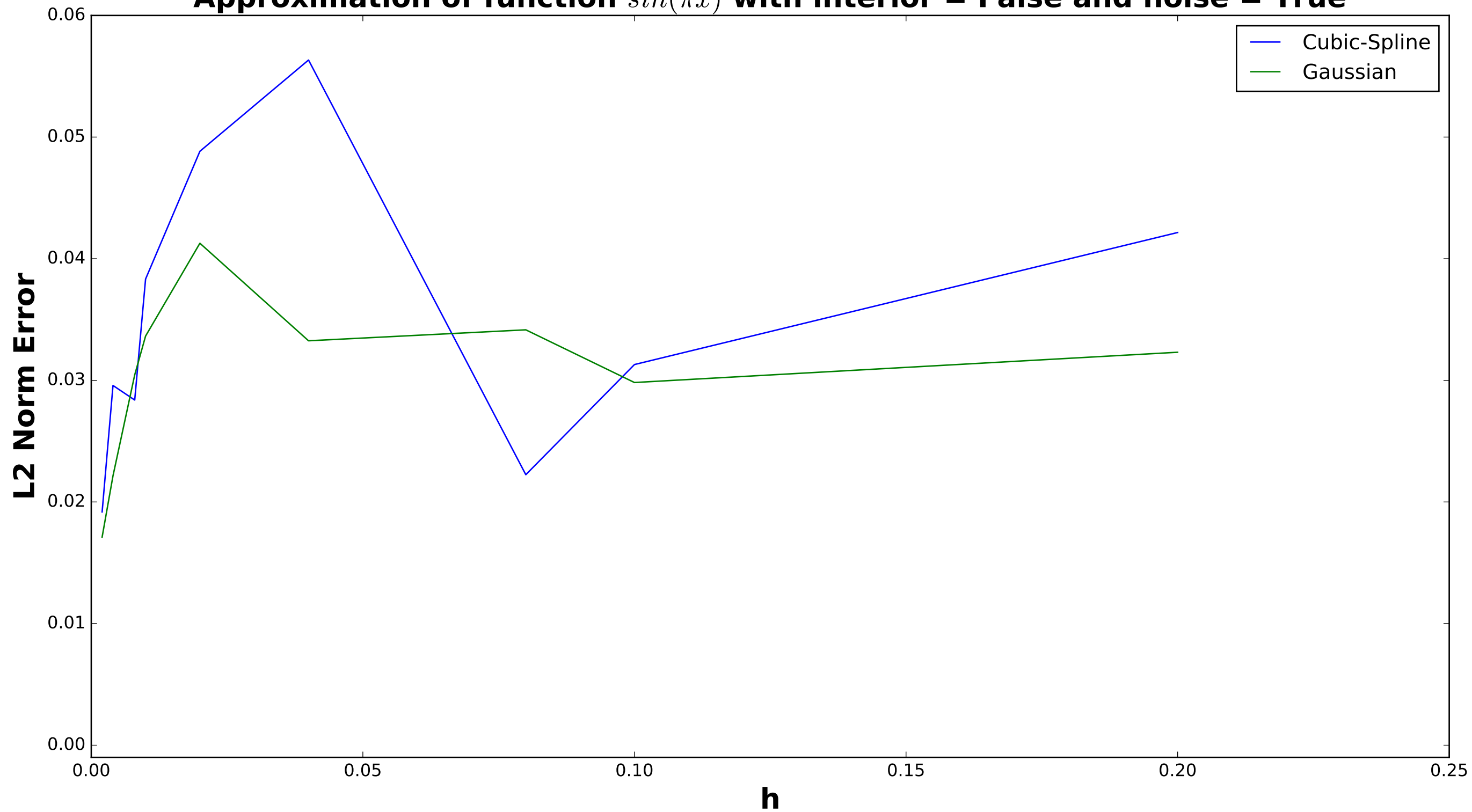
Approximation of derivative of function $\sin(\pi x)$ with interior = False and noise = False



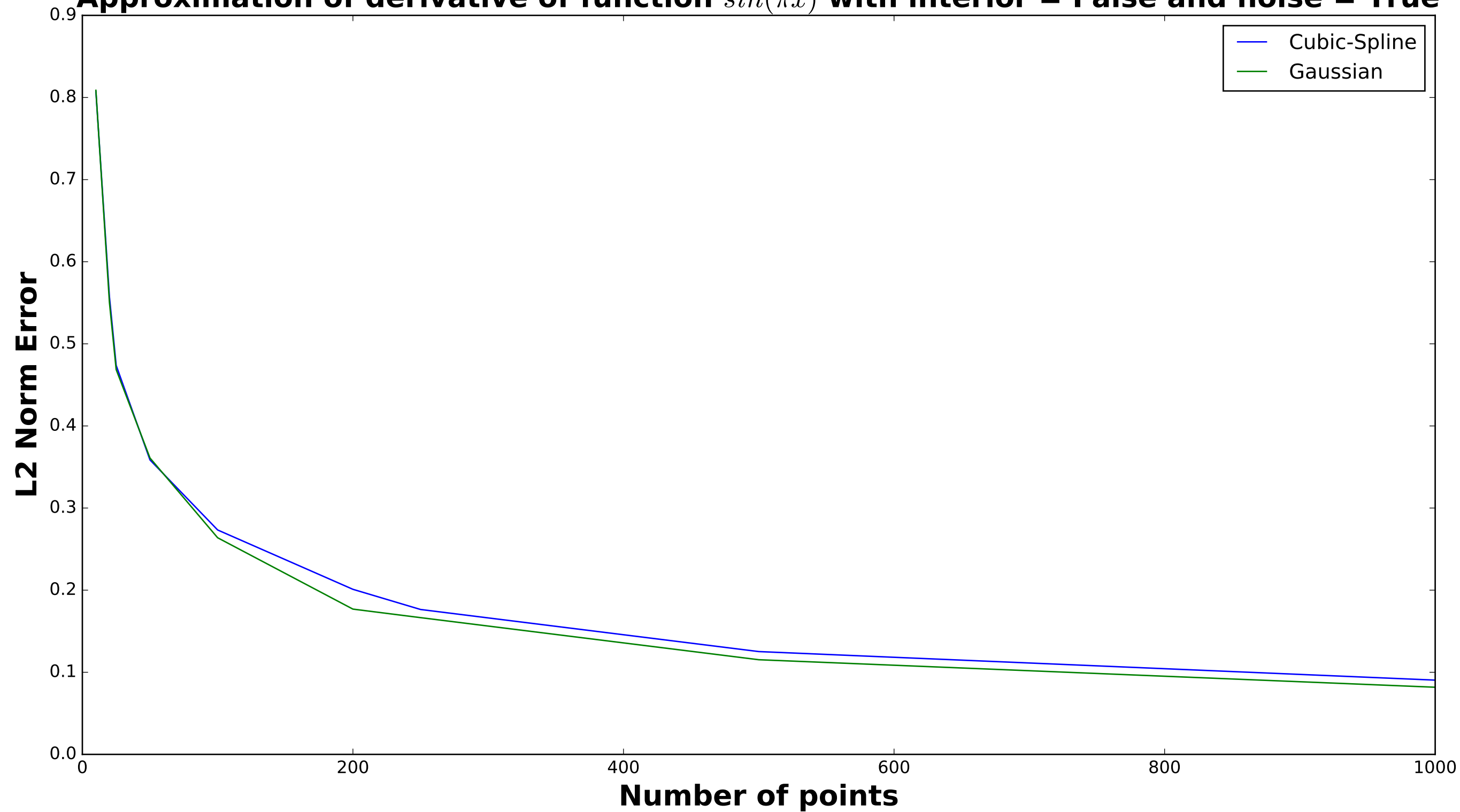
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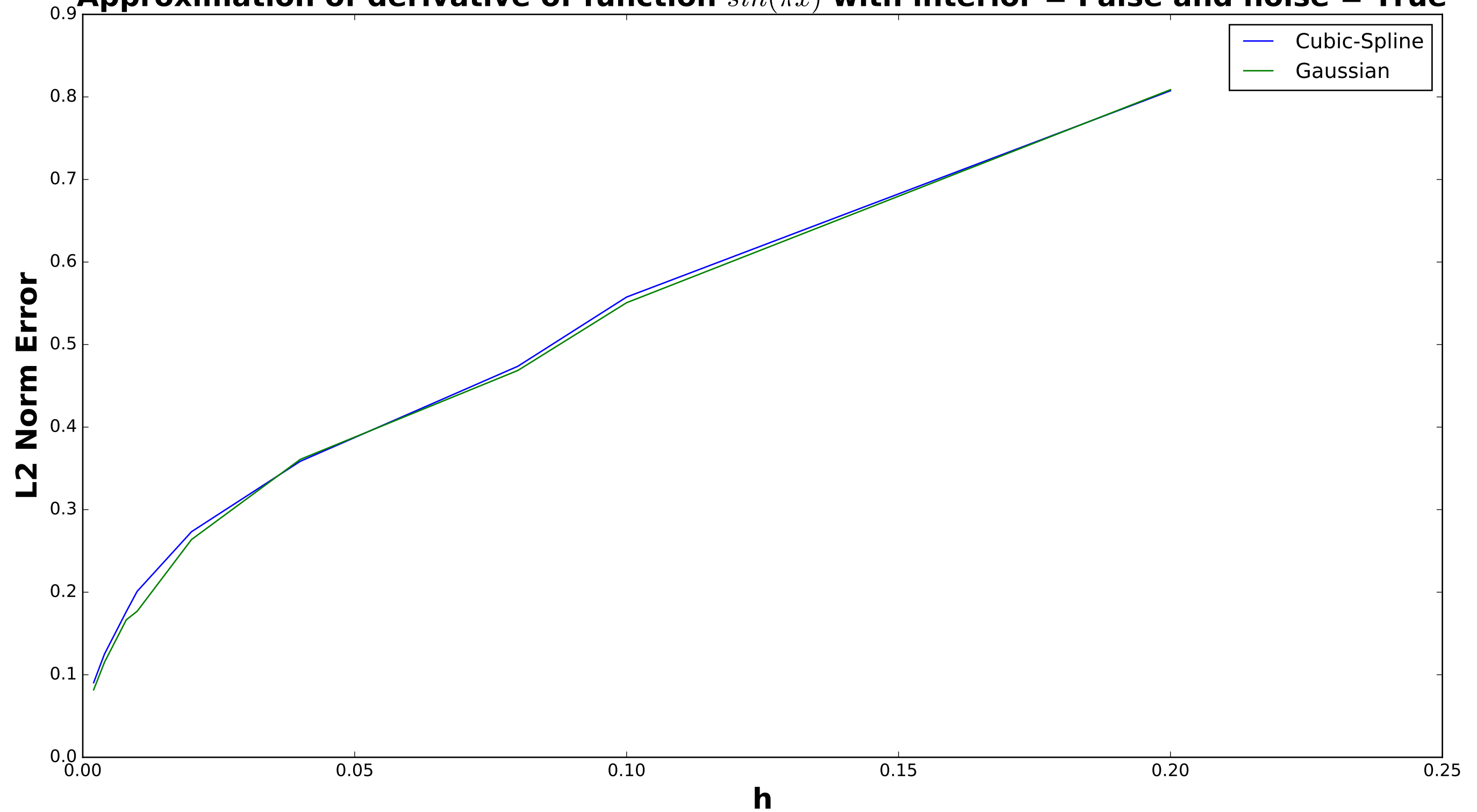
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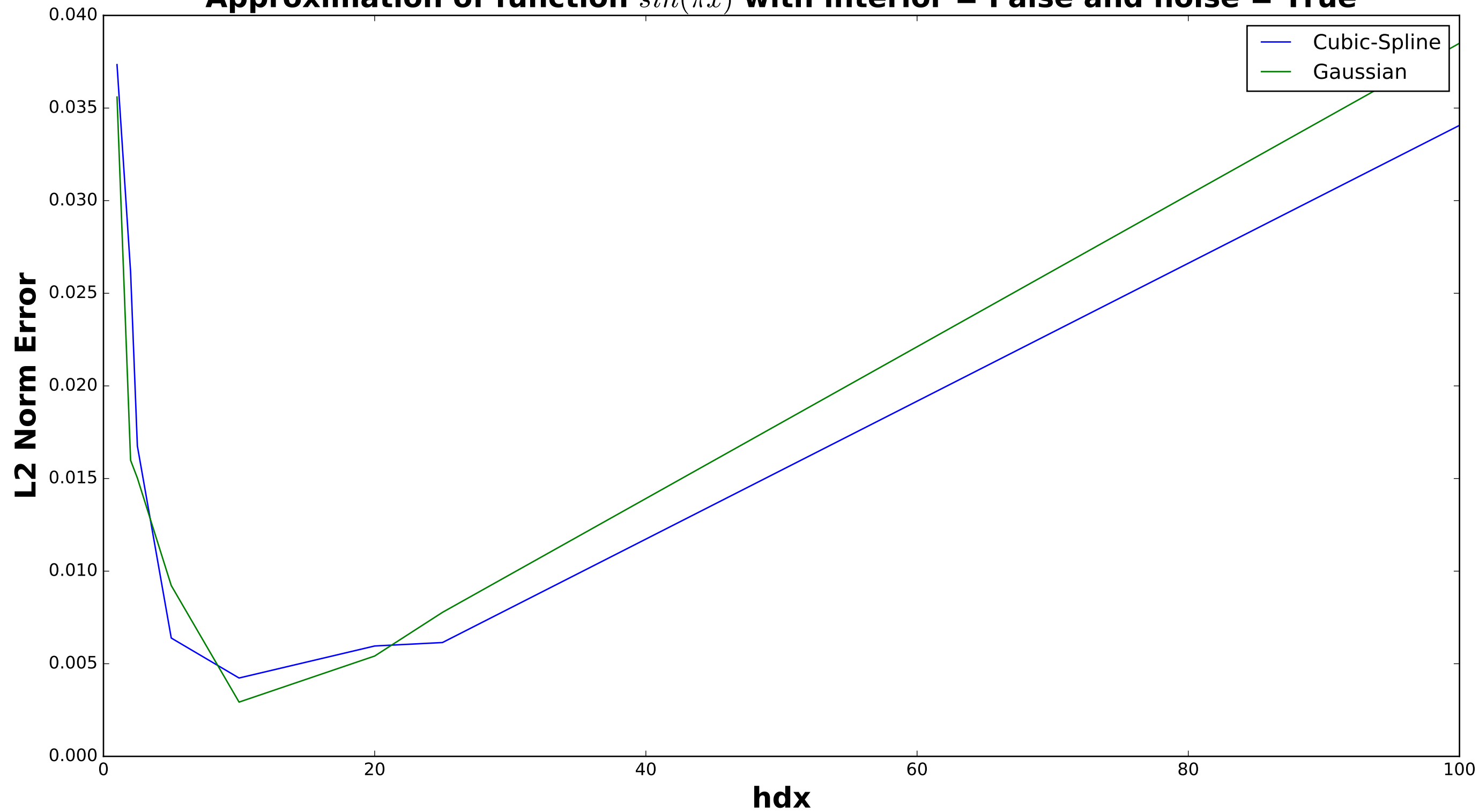
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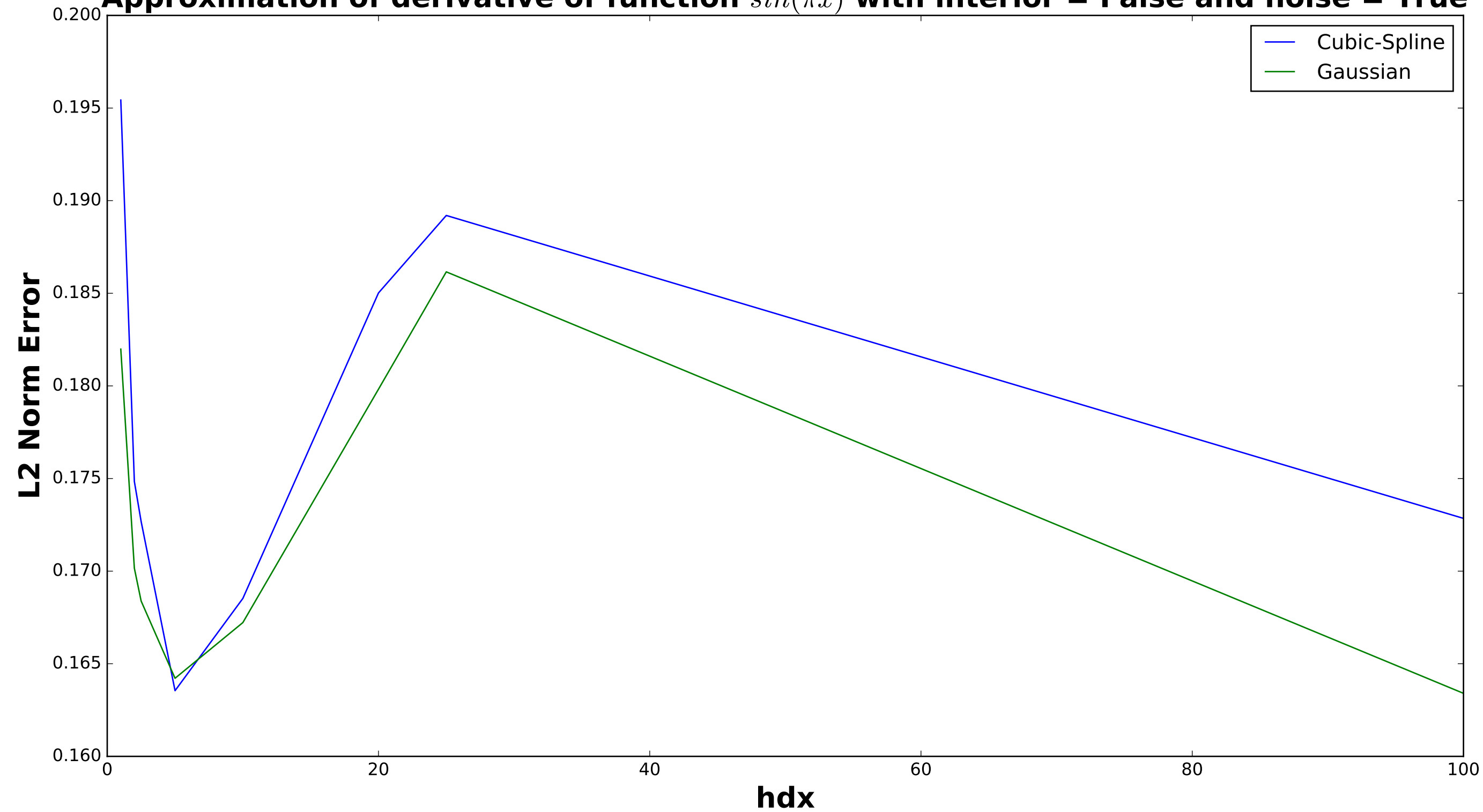
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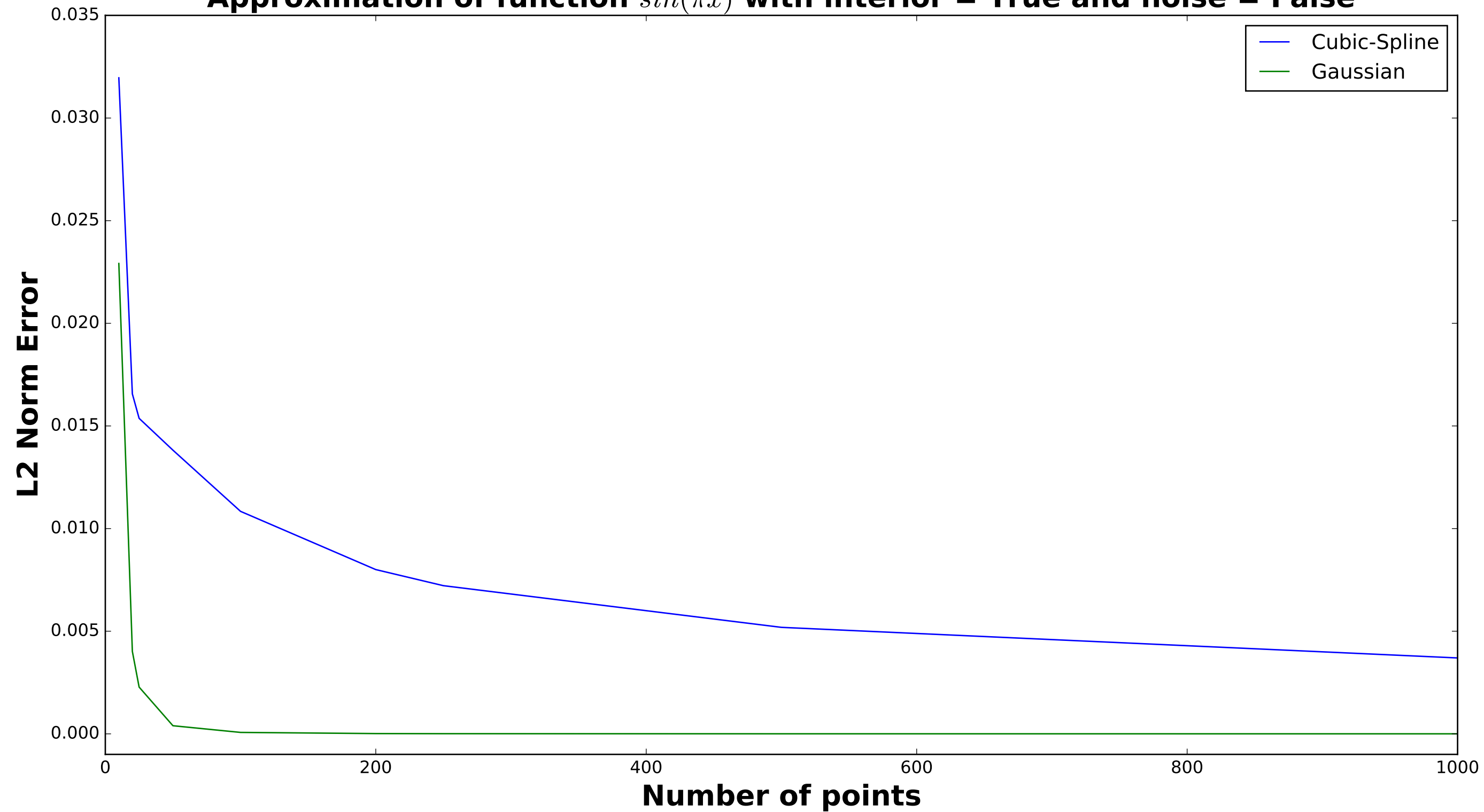
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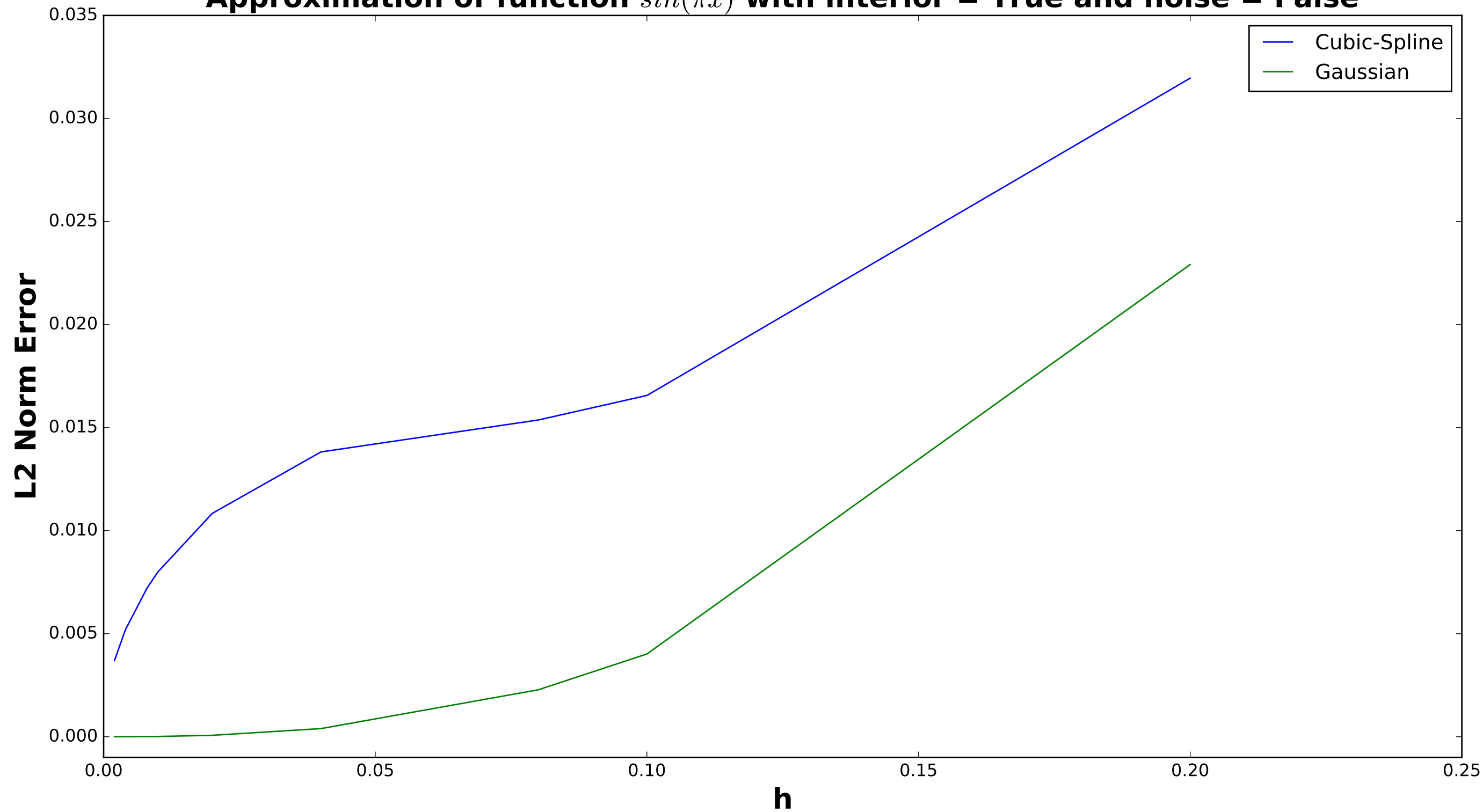
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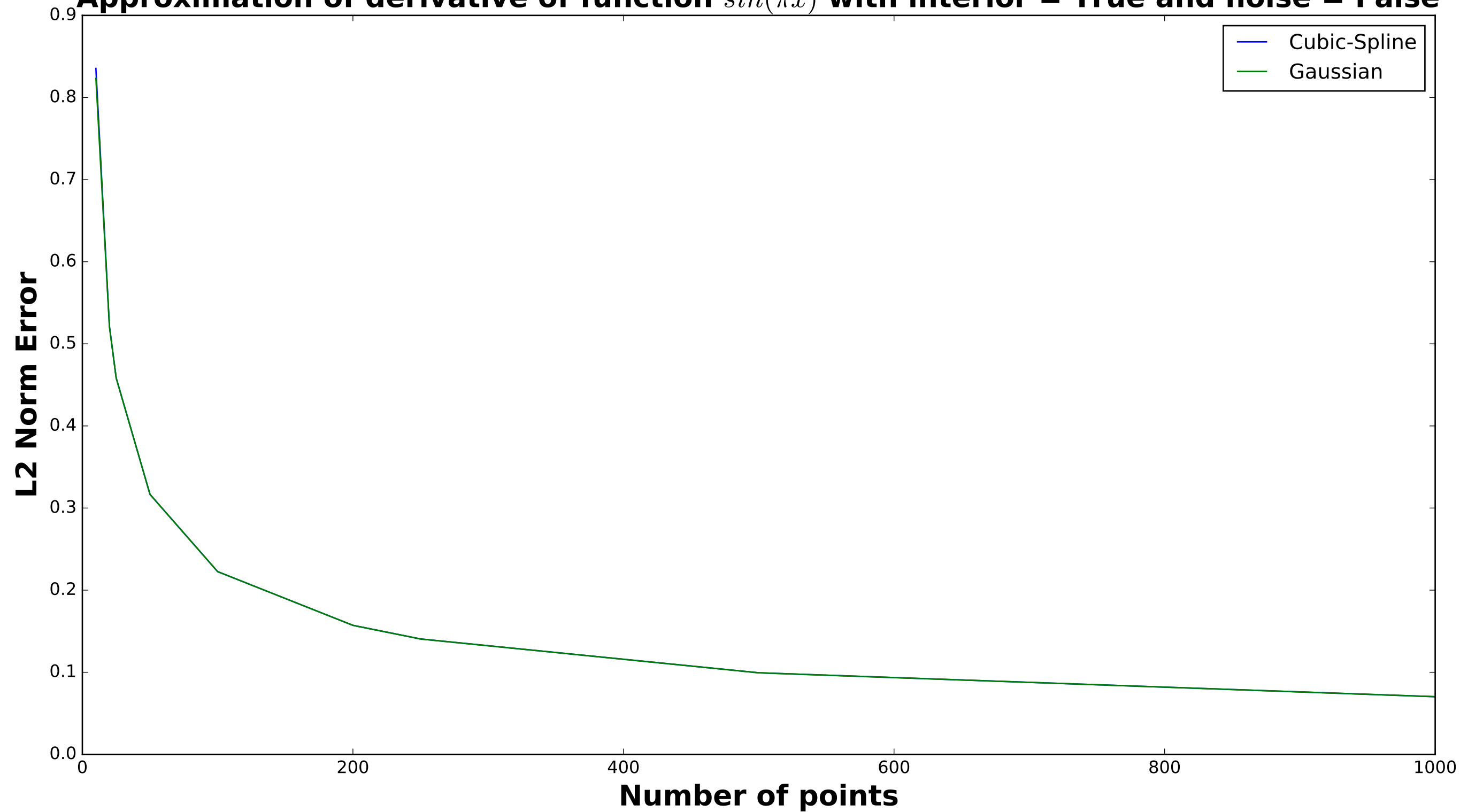
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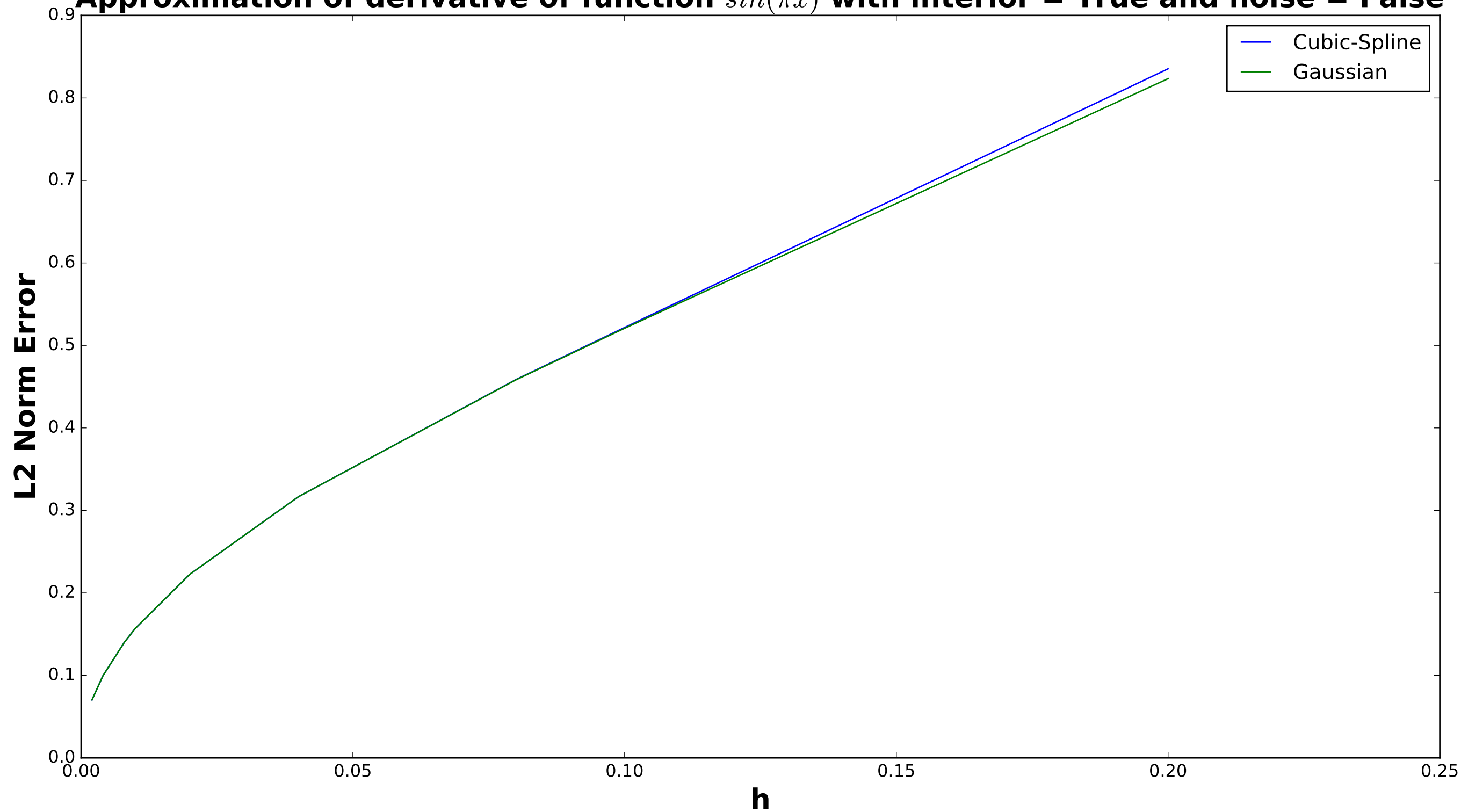
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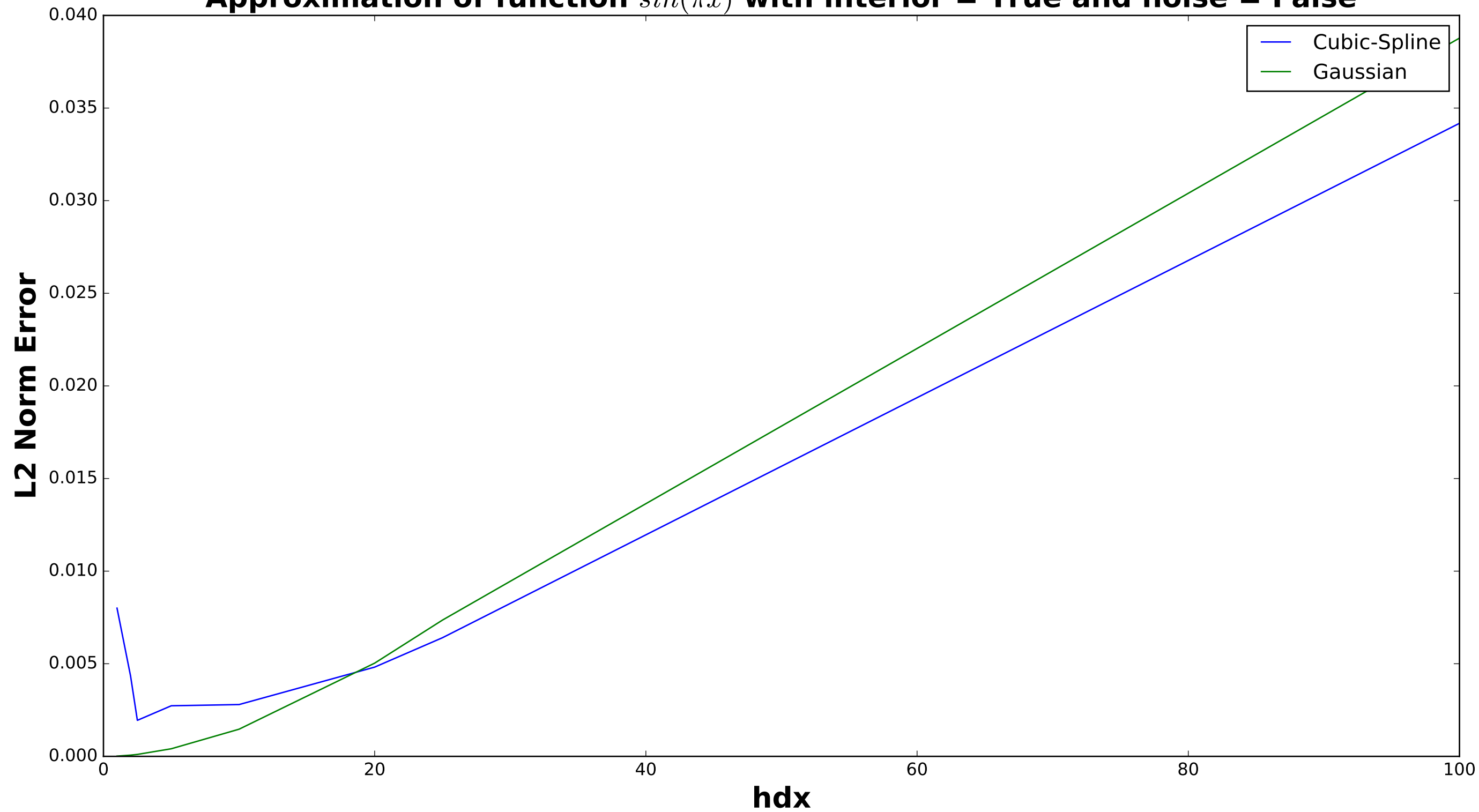
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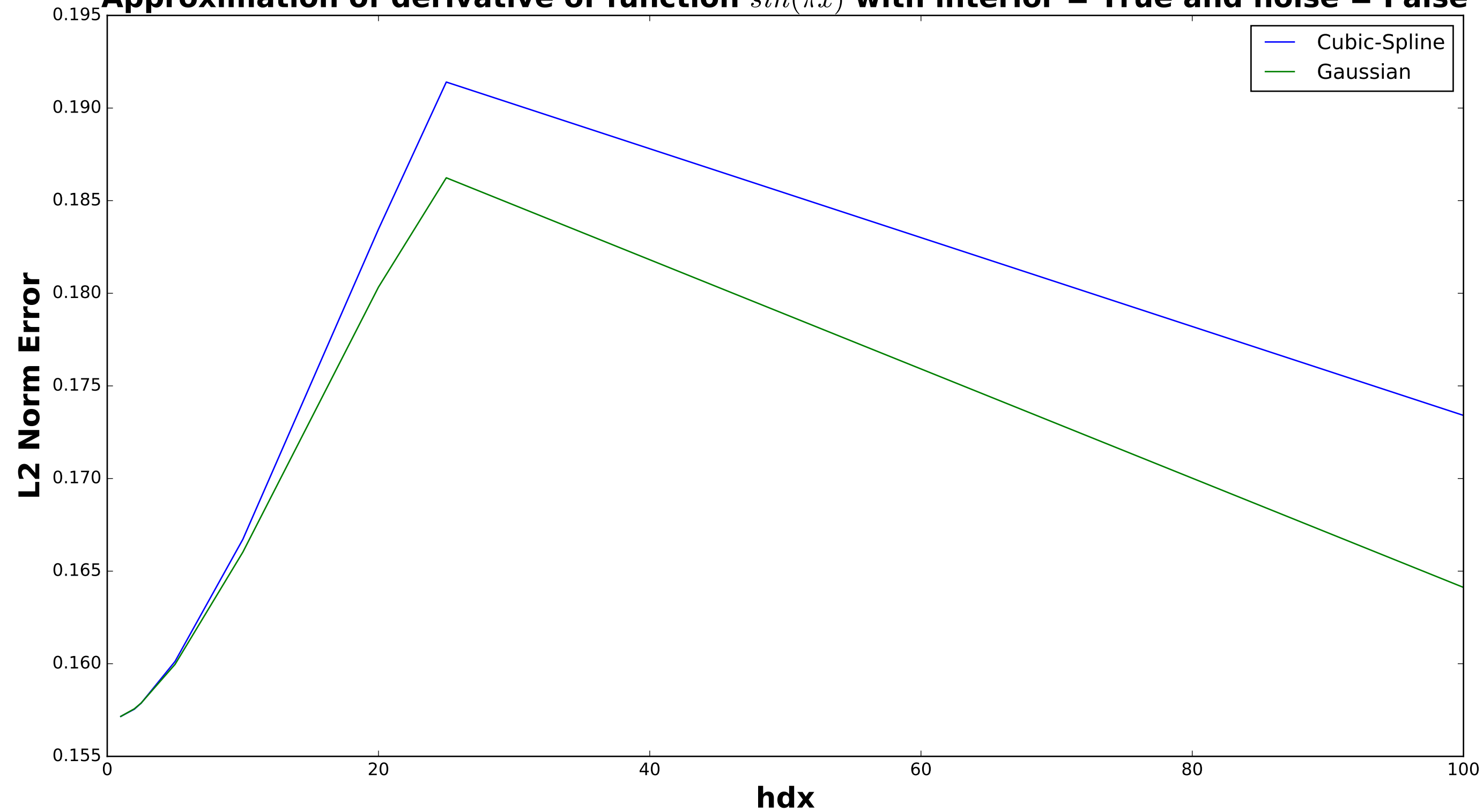
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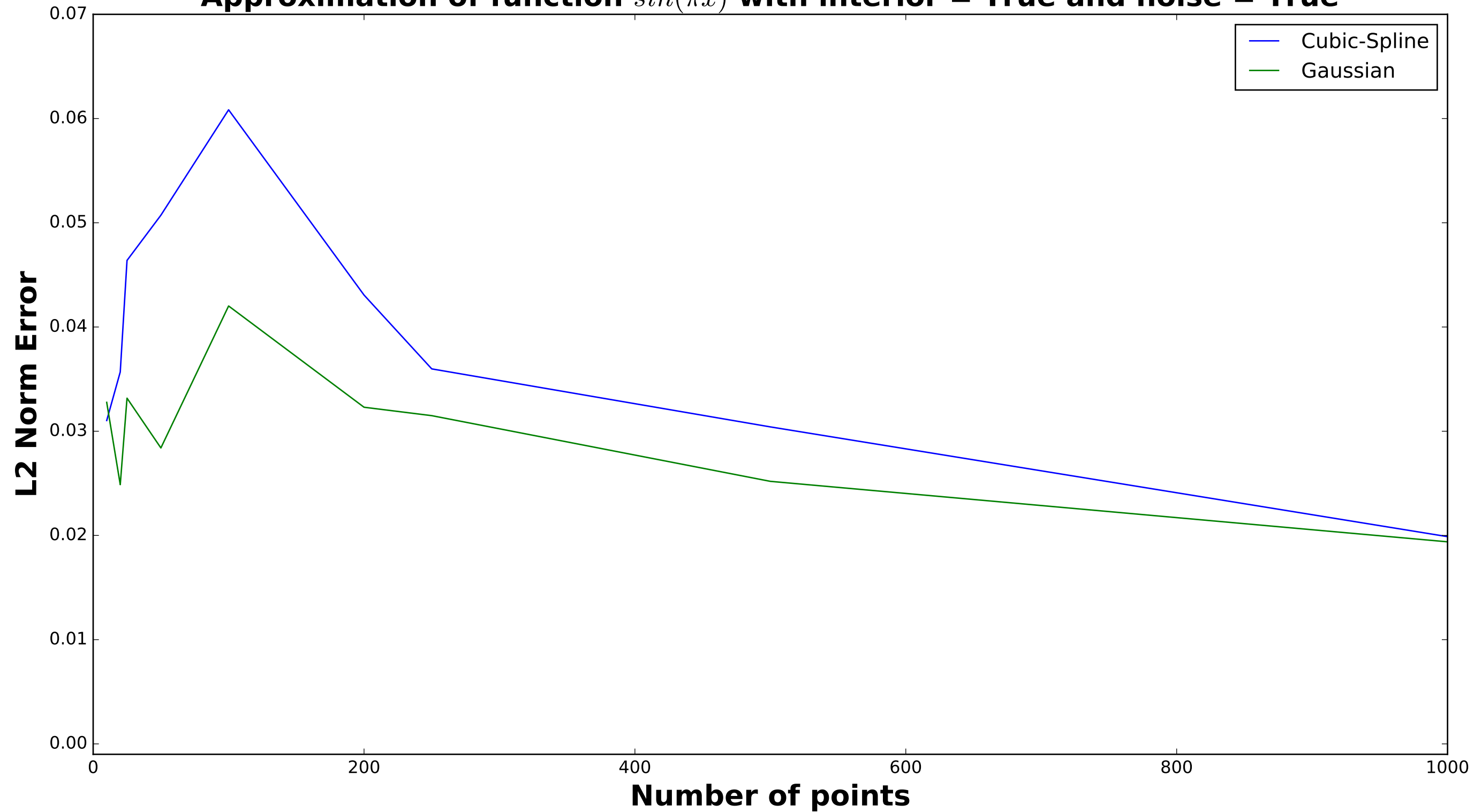
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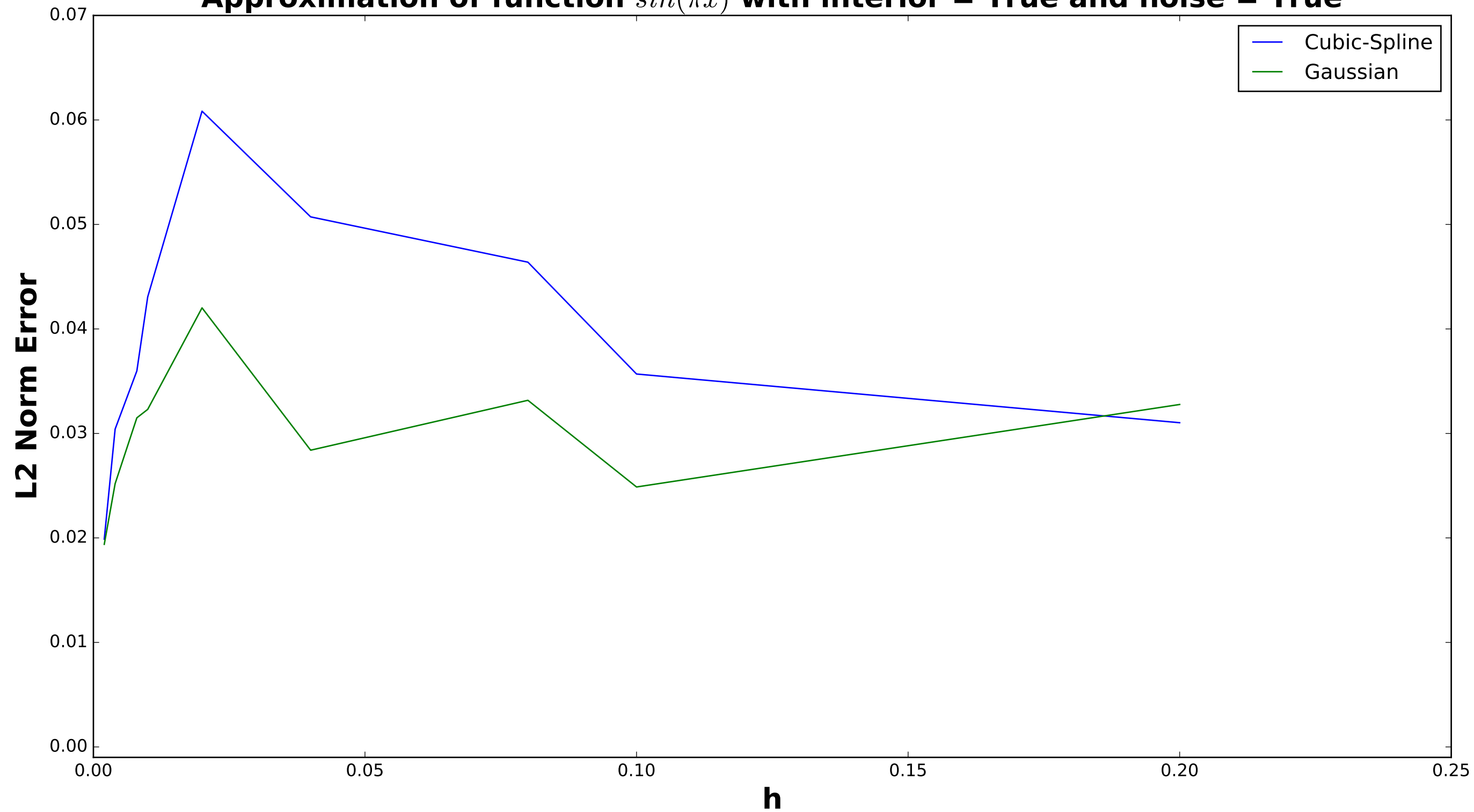
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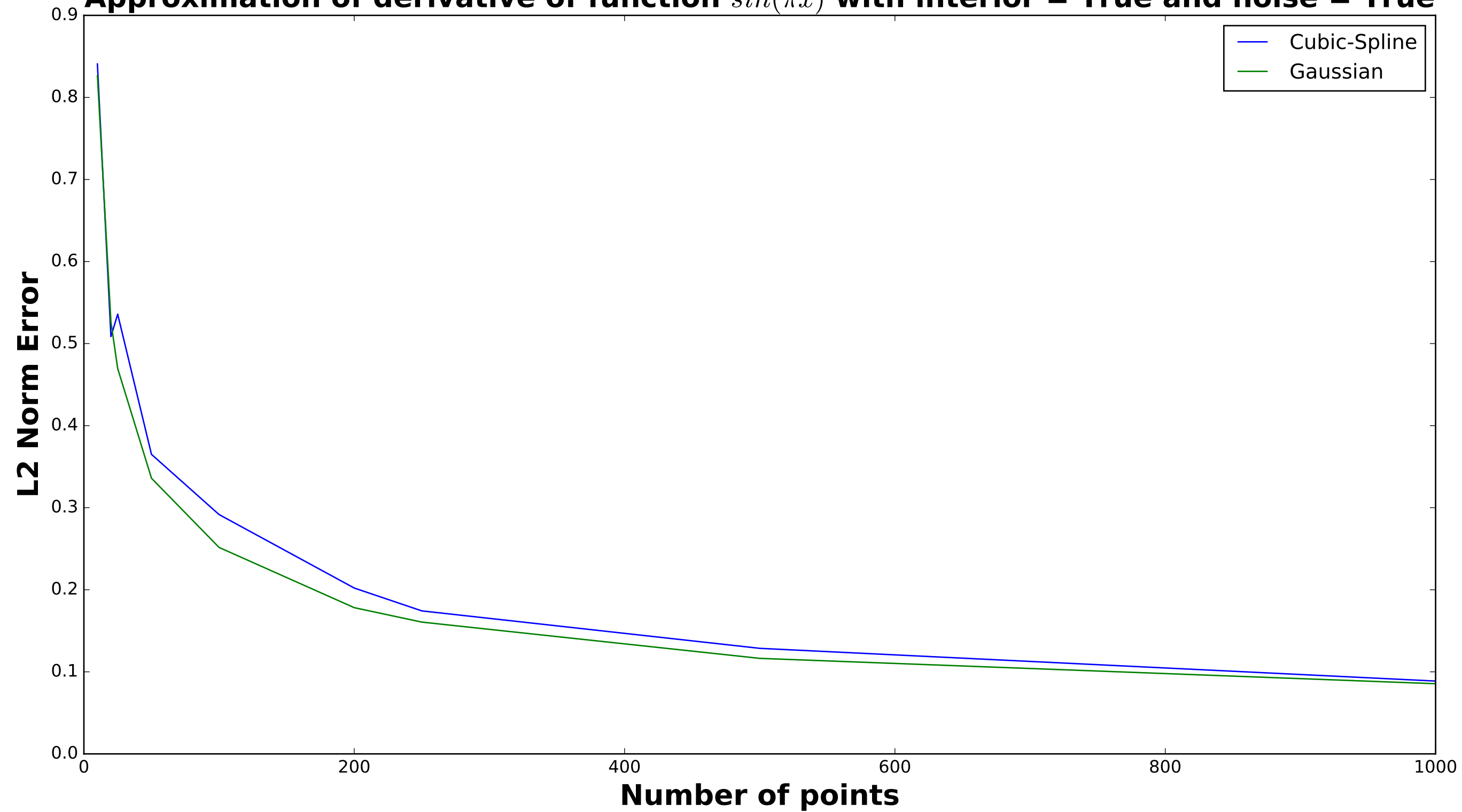
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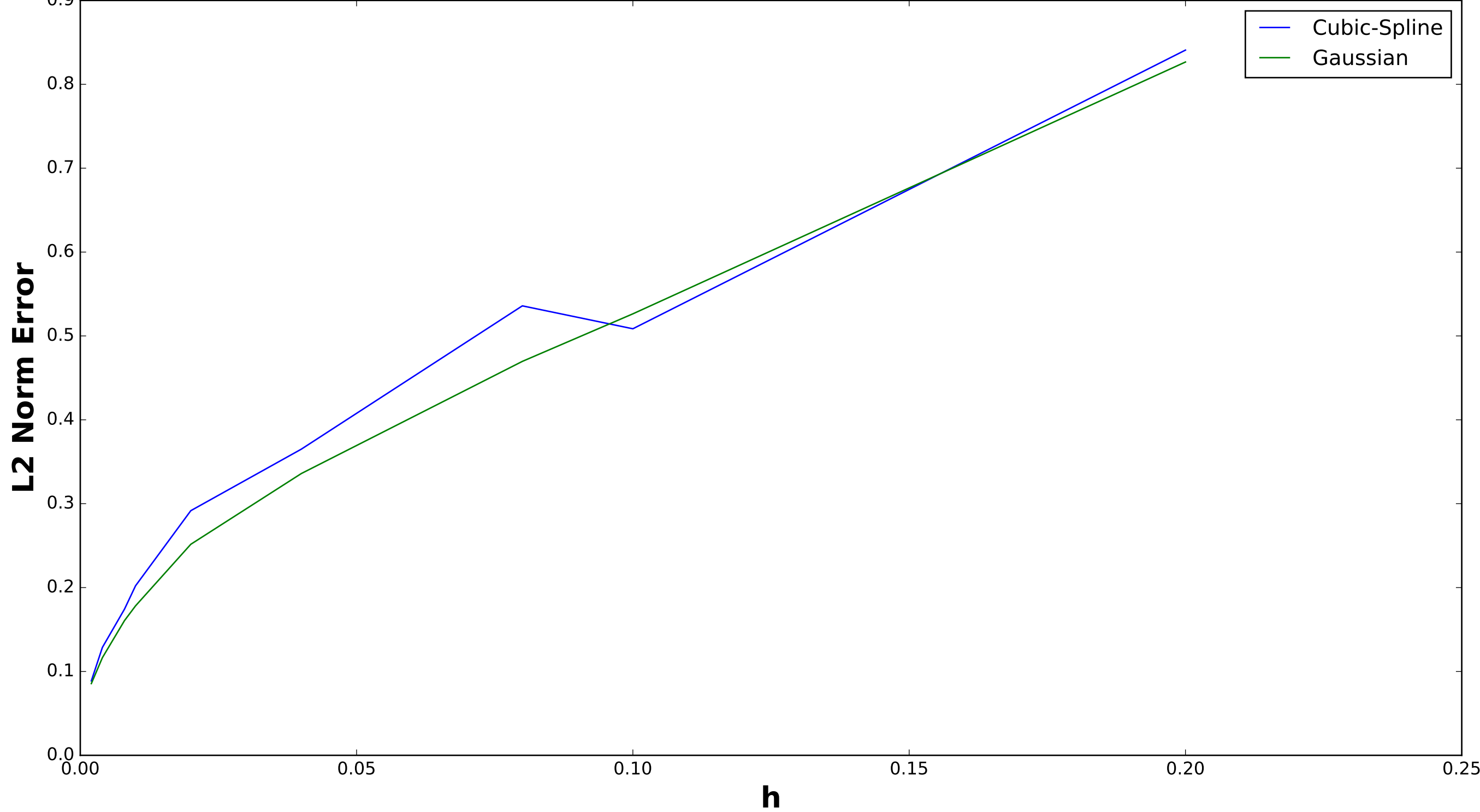
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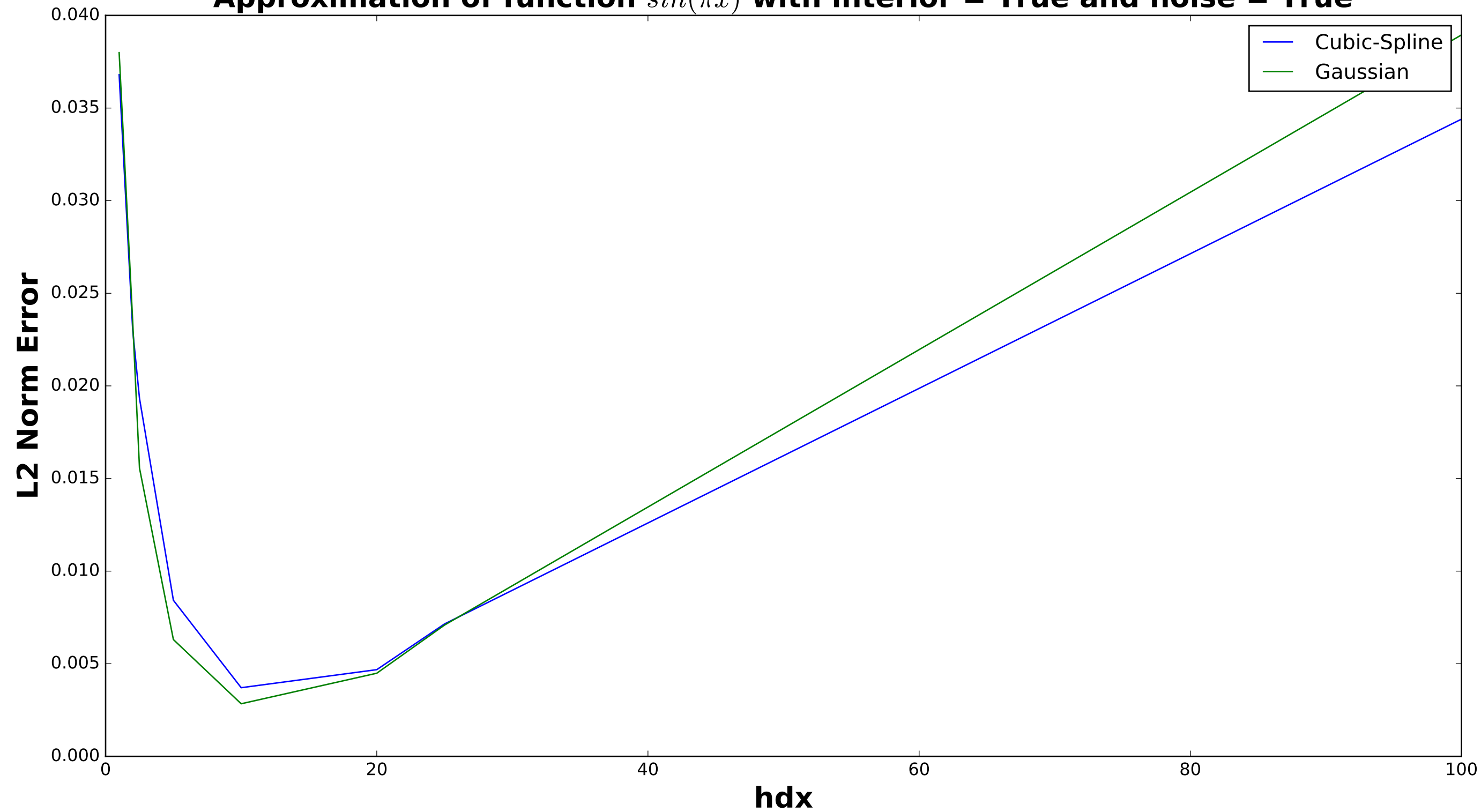
Approximation of derivative of function $\sin(\pi x)$ with interior = True and noise = True



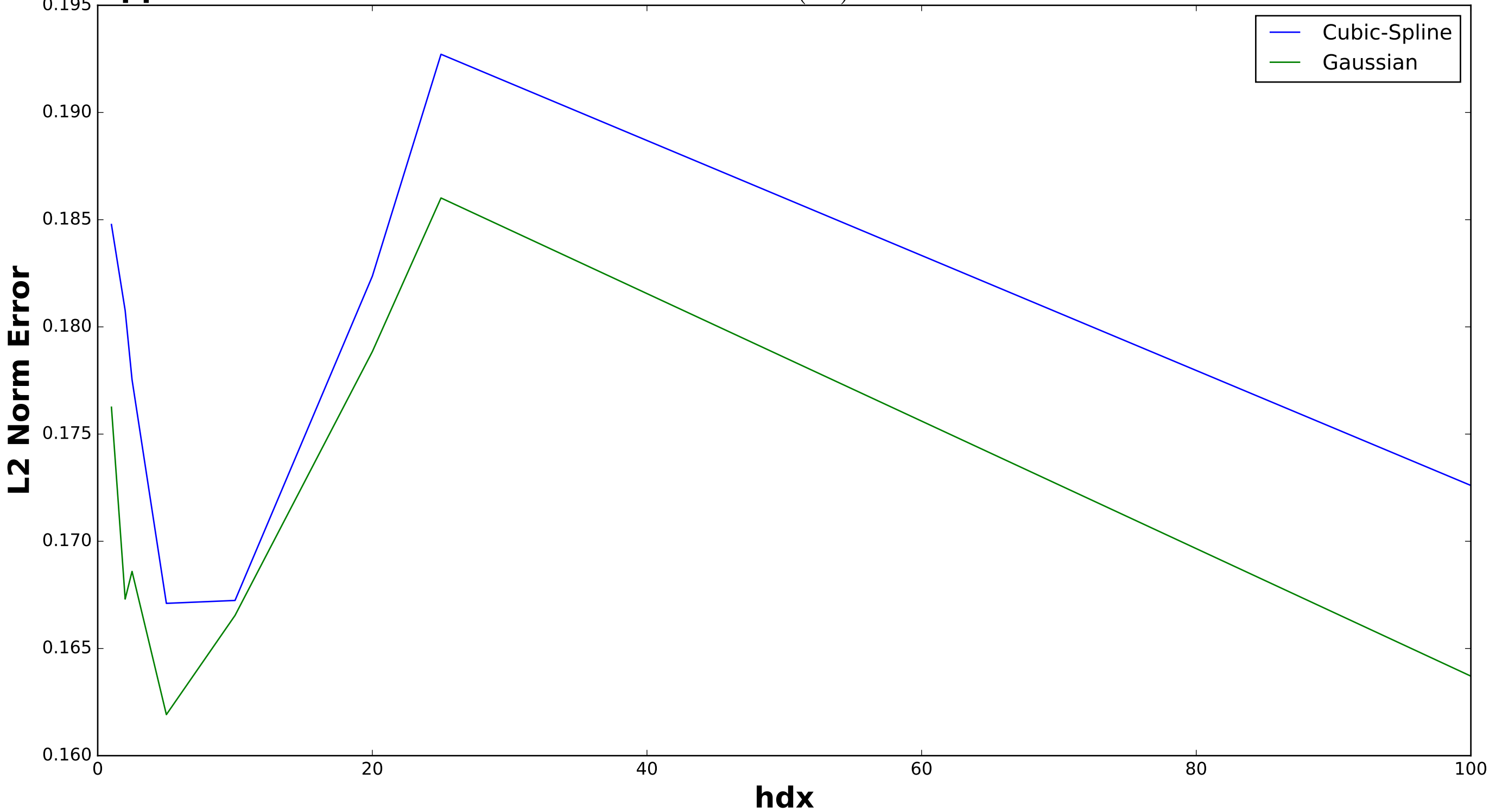
Approximation of derivative of function $\sin(\pi x)$ with interior = True and noise = True



Approximation of function $\sin(\pi x)$ with interior = True and noise = True



Approximation of derivative of function $\sin(\pi x)$ with interior = True and noise = True



Conclusions

1) Gaussian kernel is better than Cubic-Spline kernel

2) Error during approximating the derivative is higher than the error during approximating the function

3) Implementing noise to the position of the particle does not improve the approximation of the function
but it improves the approximation of the derivative of the function

4) Taking only interior points decreases the error

5) Error increases with increase in h_{dx} if there is no noise when approximating the function but when there is noise the error decreases until some value of h_{dx} which is around 10 and then increases again

Ideally to approximate a function and its derivative, Gaussian kernel with a h_{dx} value 10 with noise is best and it would further help if the approximation is carried out at the interior points