

Appendix Prosjekt 2 NumDiff

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1 Stiffnessmatrix A

A=

[20.9	-19.9	0.	0.	0.	0.	0.	0.	0.	0.]
[-20.9	27.8	-6.8	0.	0.	0.	0.	0.	0.	0.]
[0.	-7.8	33.7	-25.9	0.	0.	0.	0.	0.	0.]
[0.	0.	-26.9	29.1	-2.	0.	0.	0.	0.	0.]
[0.	0.	0.	-3.	53.6	-50.4	0.	0.	0.	0.]
[0.	0.	0.	0.	-51.4	73.	-21.6	0.	0.	0.]
[0.	0.	0.	0.	0.	-22.6	28.7	-6.	0.	0.]
[0.	0.	0.	0.	0.	0.	-7.	16.4	-9.3	0.]
[0.	0.	0.	0.	0.	0.	0.	-10.3	24.9	-14.6]
[0.	0.	0.	0.	0.	0.	0.	0.	-15.6	14.6]

Figure 1: Stiffnessmatrix A with $\alpha = b = x = 1$, 10 random nodes from 0 to 1

2 Plots

2.1 Plots for smooth functions

2.1.1 Numerical/exact solution- and convergence-plot for $x(x-x)$

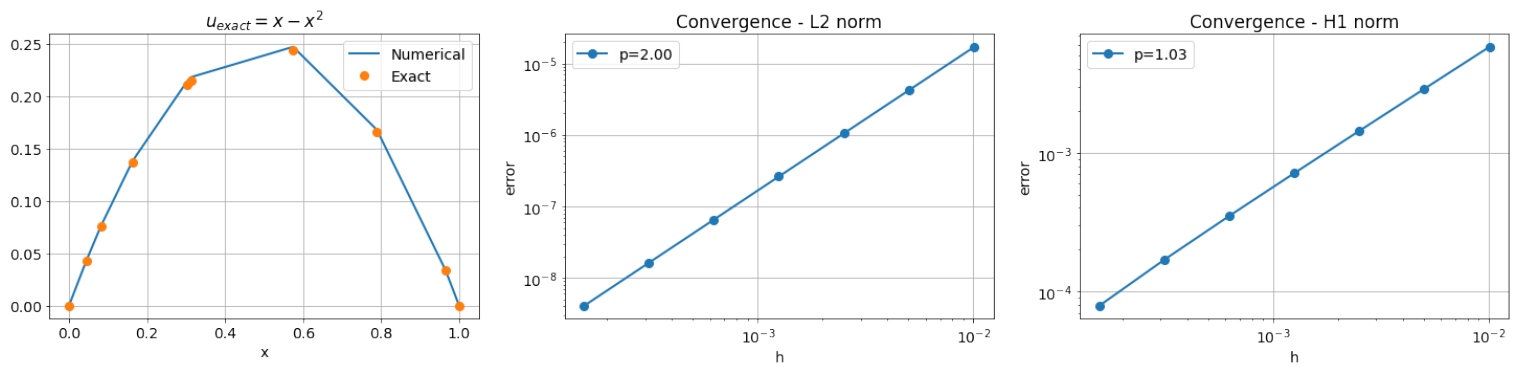


Figure 2: $x(x-x)$

2.1.2 Numerical/exact solution- and convergence-plot for $\sin(3\pi x)$

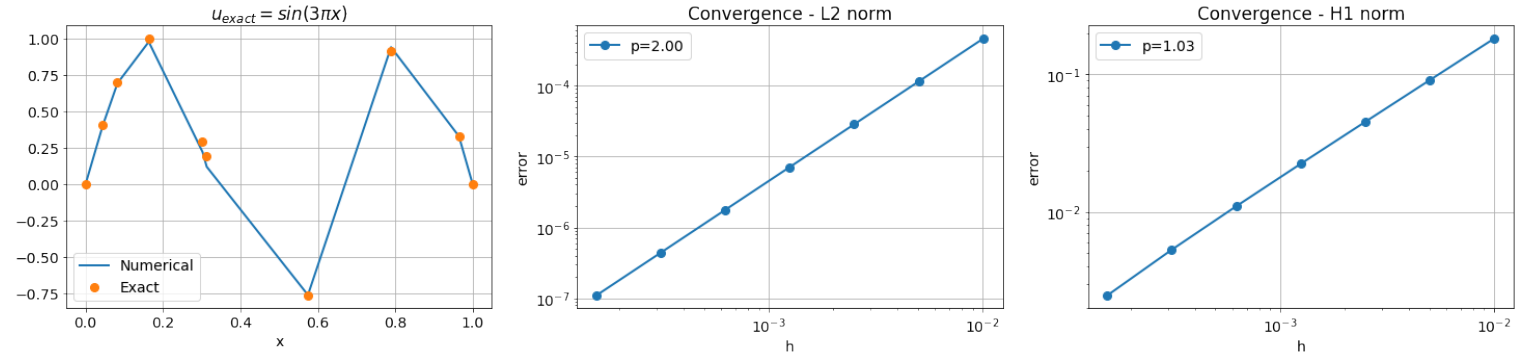


Figure 3: $\sin(3\pi x)$

2.2 Plots for non-smooth functions

2.2.1 Numerical-, exact solution- and convergence-plot for $w_1(x)$

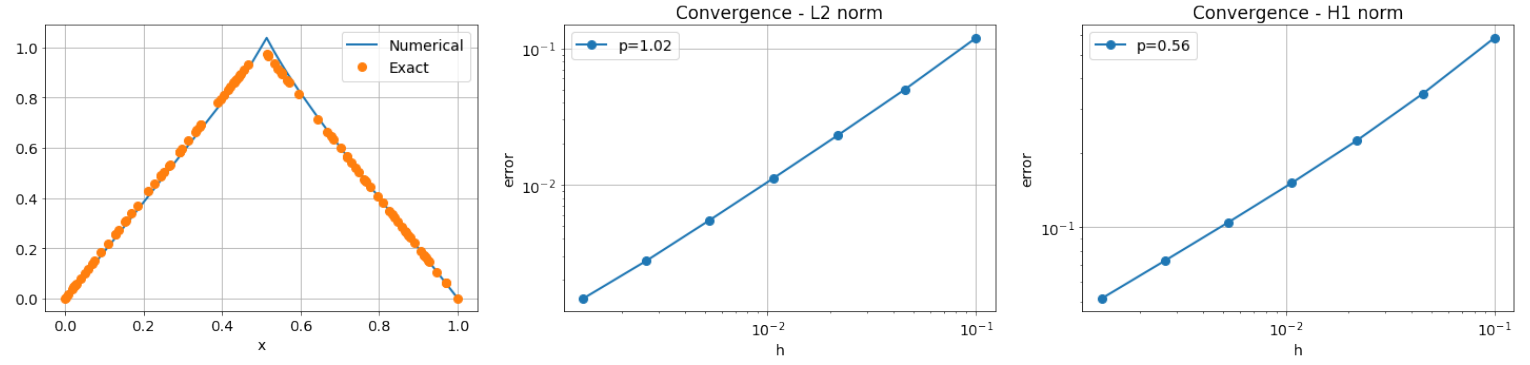


Figure 4: $w_1(x)$

2.2.2 Numerical-, exact solution- and convergence-plot for $w_2(x)$

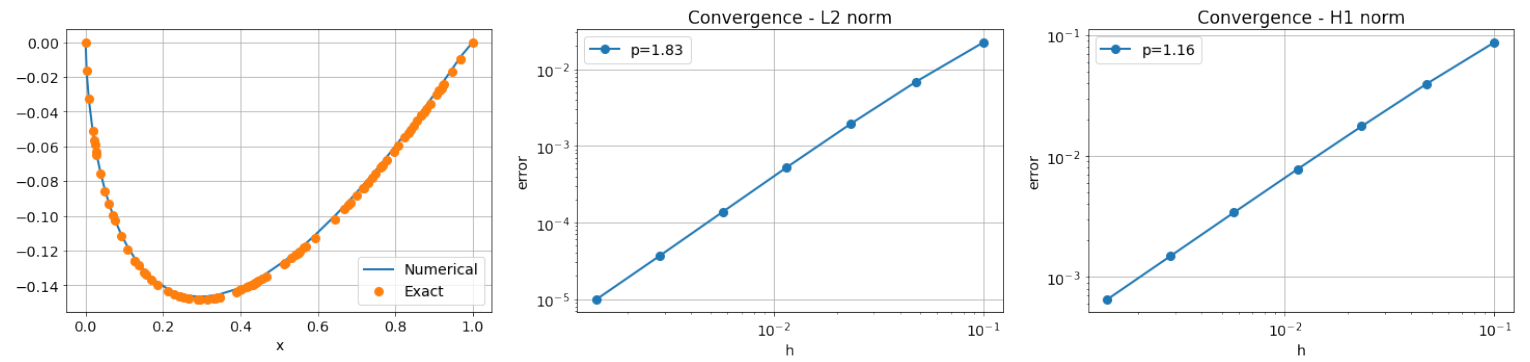


Figure 5: $w_2(x)$

2.3 Plots for shifted function with equidistant nodes and nodes centered around 0

2.3.1 Numerical solution- and convergence-plot for $x^{-\frac{1}{4}}$

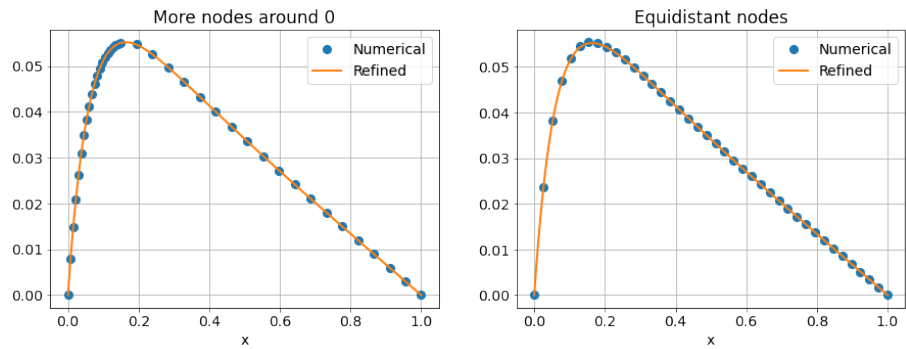


Figure 6: Different distribution of nodes for $x^{(-1/4)}$

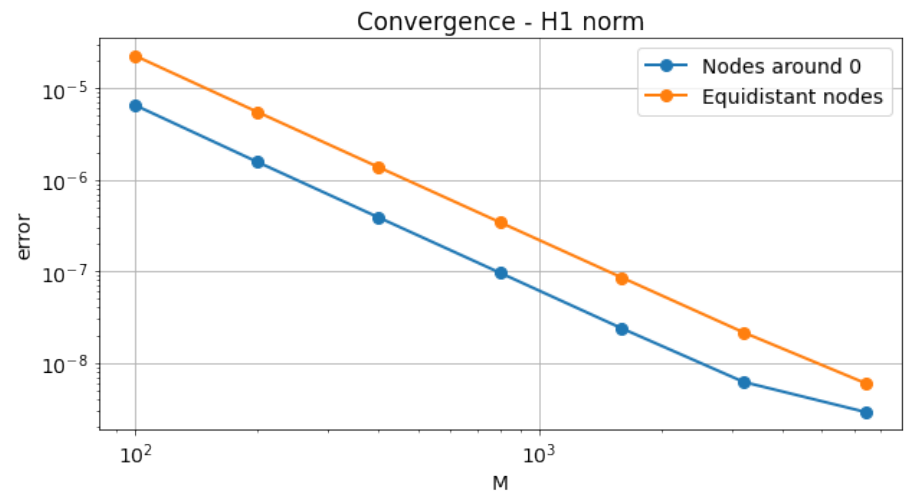


Figure 7: Convergence for different distribution of nodes