Aufgabe2_3

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Interpolation The first graph that our approximation of the function is in the actually interval very close to sqrt(x).

Extrapolation It is no suprise that the absoulte error becomes bigger as we move away from X1, also because auf the special charateritcs of the square root function. Using more interpolation value reduces the absolute error, but in relation to the original sqrt() the errro remains quite big.

Errorcomputation We modified the formular as follows to compute the maximal error.

$\Leftrightarrow \frac{f^{(n+1)}(\xi)}{(n+1)!}$

$\Leftrightarrow \frac{\frac{1}{2}(-\frac{1}{2})...(-\frac{2(n+1)-1}{2})}{(n+1)!}$

$\Leftrightarrow \frac{\prod_{i=1}^{n+1}(-\frac{2(i+1)-1}{2})}{\prod_{i=1}^{n+1} i}$

$\Leftrightarrow (-1)^{(n+1)} \prod_{i=1}^{n+1}(1 - \frac{3}{2i})$

It seems that our code doesen't work so well, when computing the maximum error, since the maximal error is way much smaller than our actuall error. This behaviour could be caused by extrapolation, but also near the interpolation intervall the absolute error stays bigger.

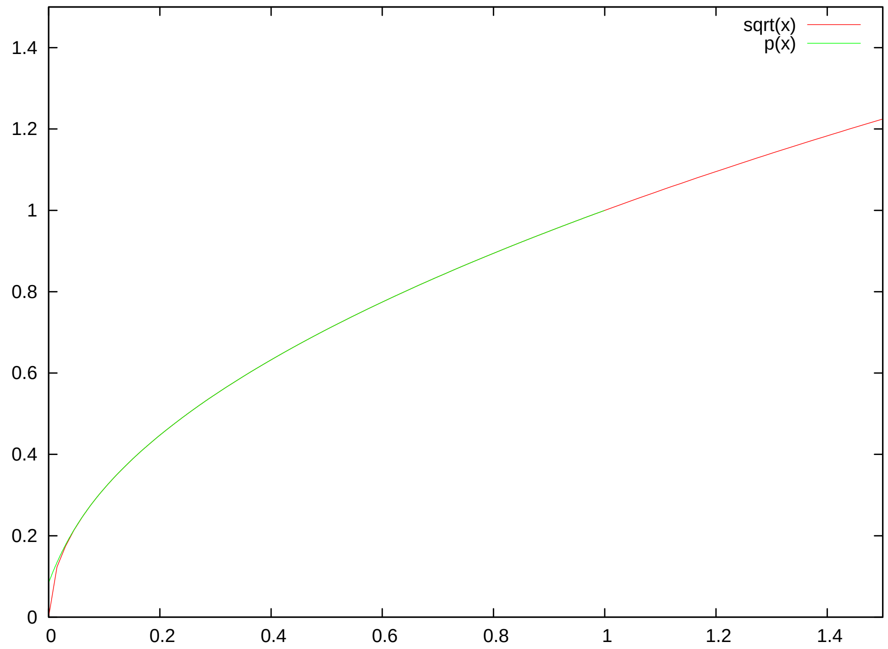

Abbildung 1: *plot of the hole interval using 15 interpolation values*

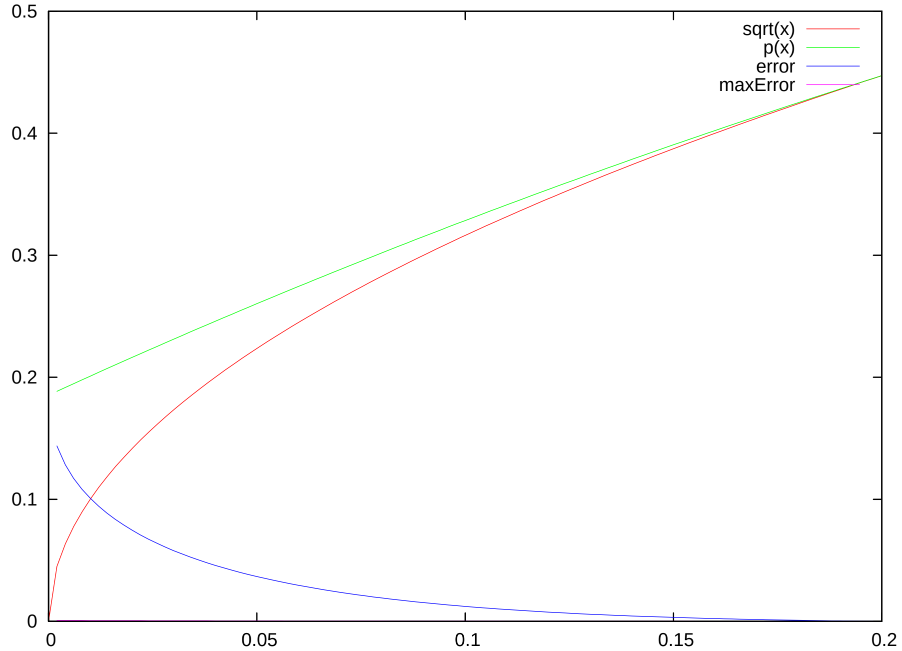

Abbildung 2: *Results using 5 interpolation values*

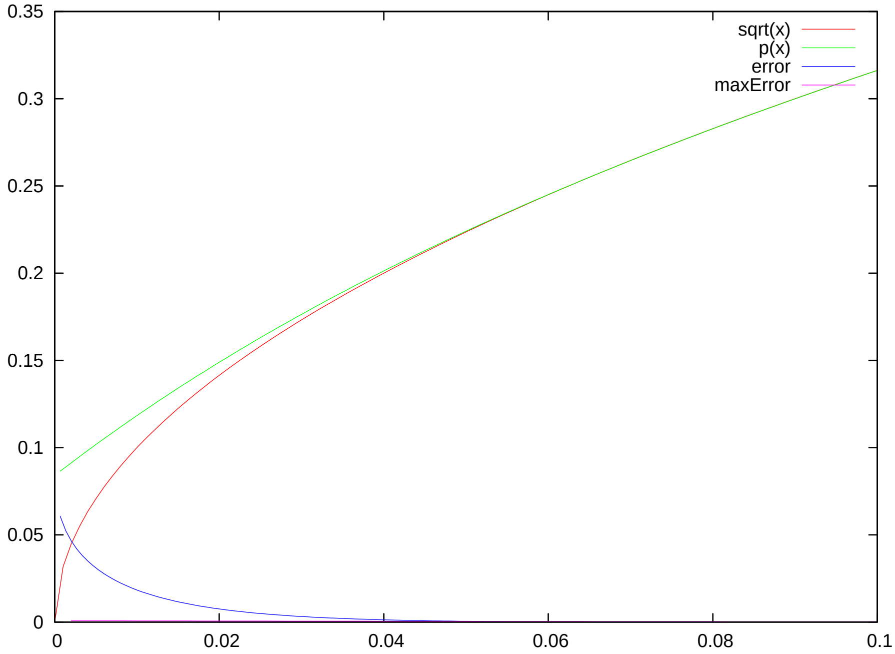

Abbildung 3: *Results using 10 interpolation values*

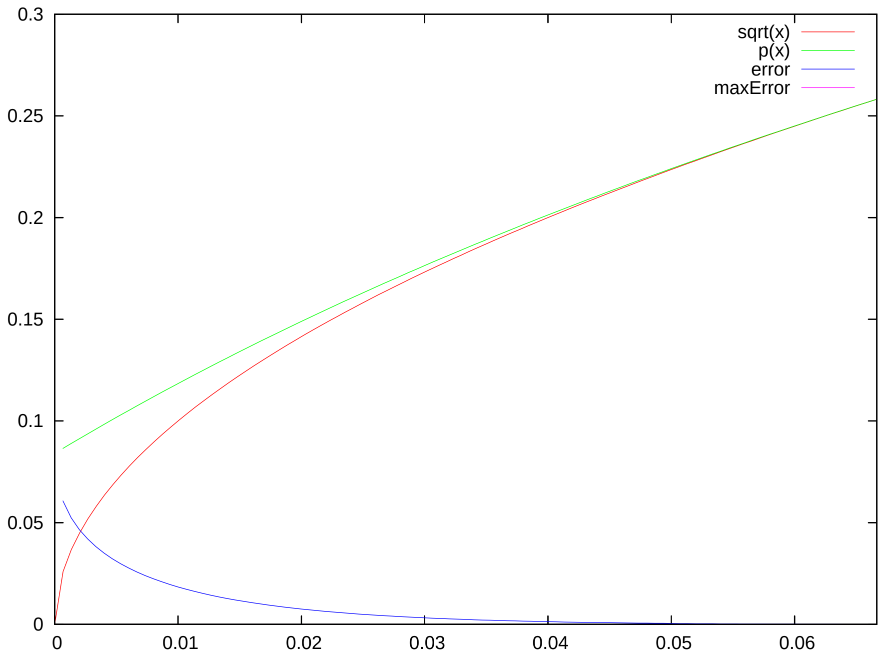

Abbildung 4: *Results using 15 interpolation values*