

Mathematik in der Wissenschaft des Himmels

The background of the slide is a deep space image showing a vast field of stars. In the center, there is a bright, glowing galaxy with a distinct spiral or ring-like structure, possibly a ring galaxy or a similar celestial object. The overall color palette is dark, with shades of black, dark blue, and green, punctuated by numerous white and yellow stars.

Referent: Sergiy Pereverzyev

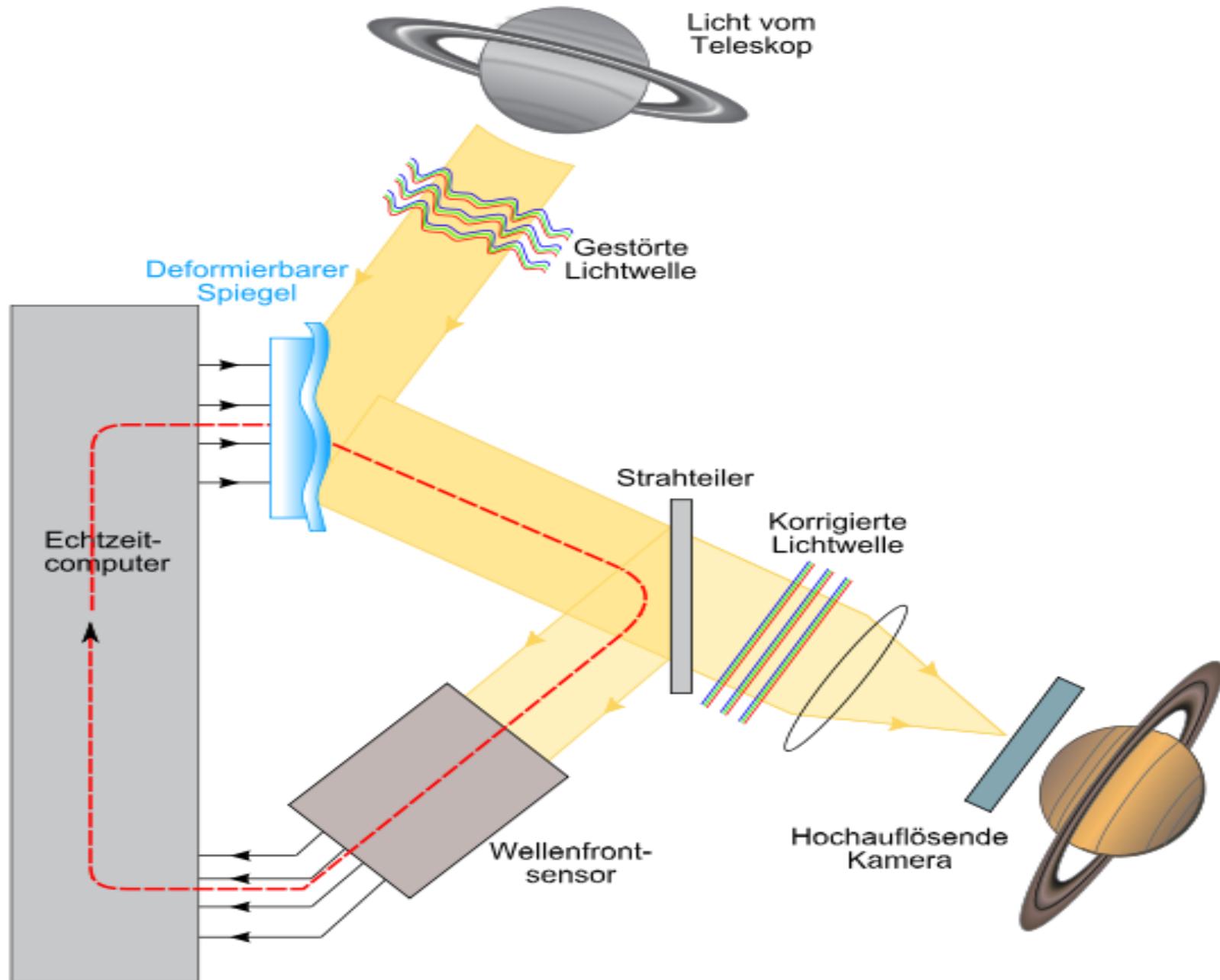
Teilnehmer: Berger, Küsel, La Marca, Lugmayr
Maier, Stockinger, Weichselbaum, Ziegler

The European Extremely Large Telescope

Kosten von 1,1 Milliarden Euro
Spiegel mit 40m Durchmesser
Fertigstellung 2018

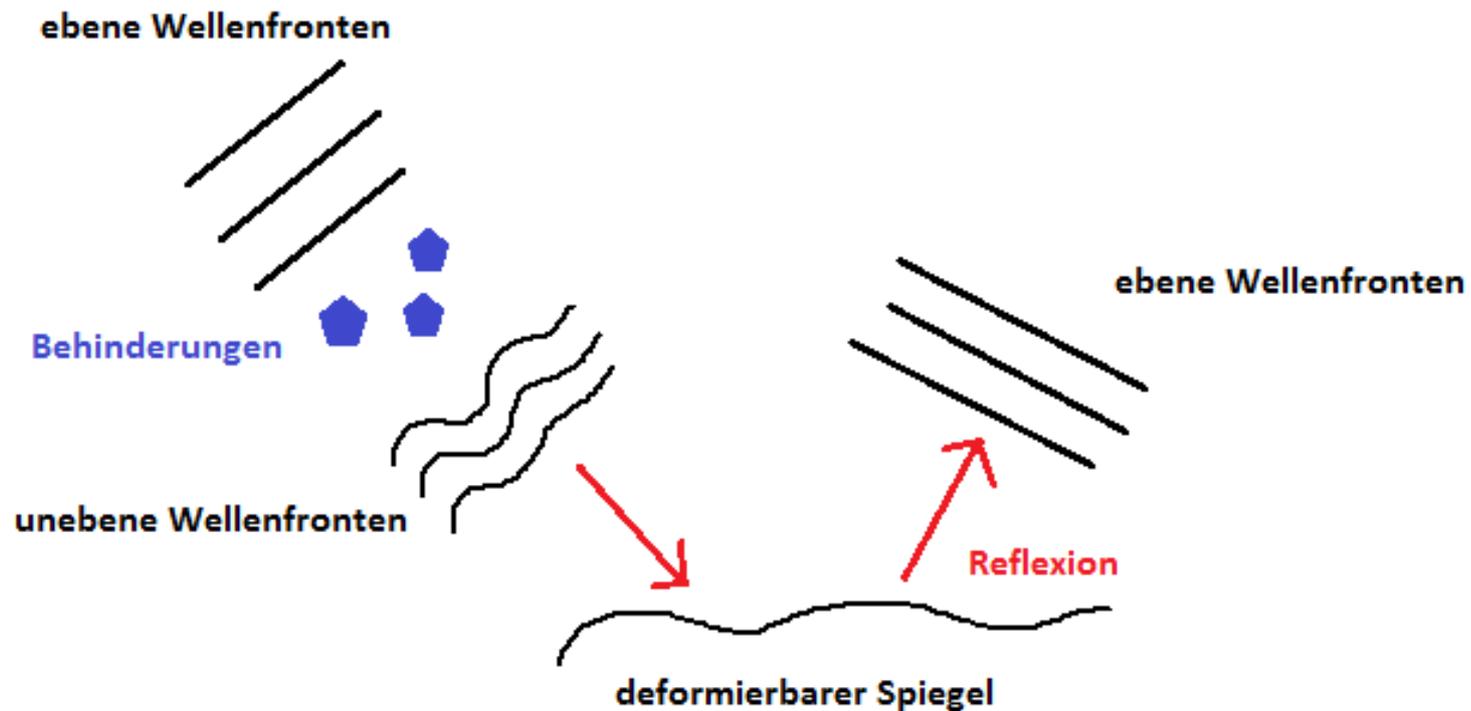


Adaptive Optik



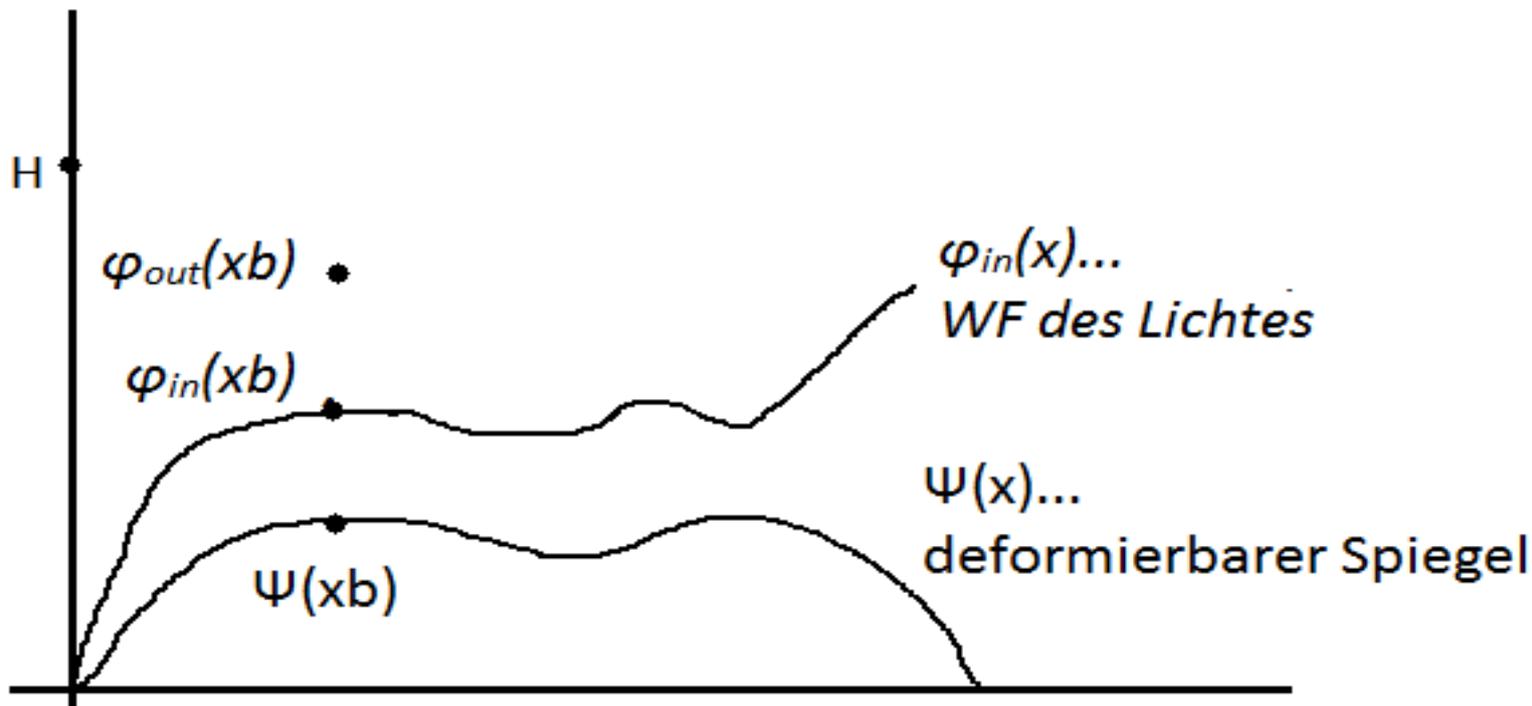
Deformierbarer Spiegel

- Reflexion → ebene Wellenfronten → scharfes Bild



Deformierbarer Spiegel

- $\varphi_{in}(x) - \Psi(x) + \varphi_{out}(x) - \Psi(x) = H$
- $\varphi_{out}(x) = 2\Psi(x) - \varphi_{in}(x) + H$
- $\varphi_{out}(x) = H \rightarrow \Psi(x) = \varphi_{in}(x)/2$

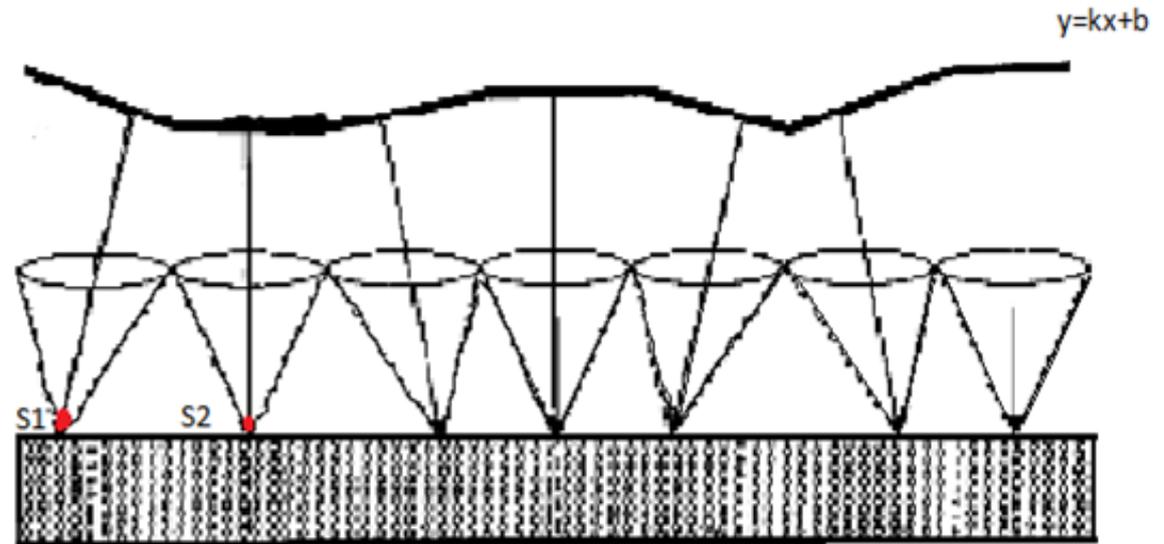


Messungsrauschen

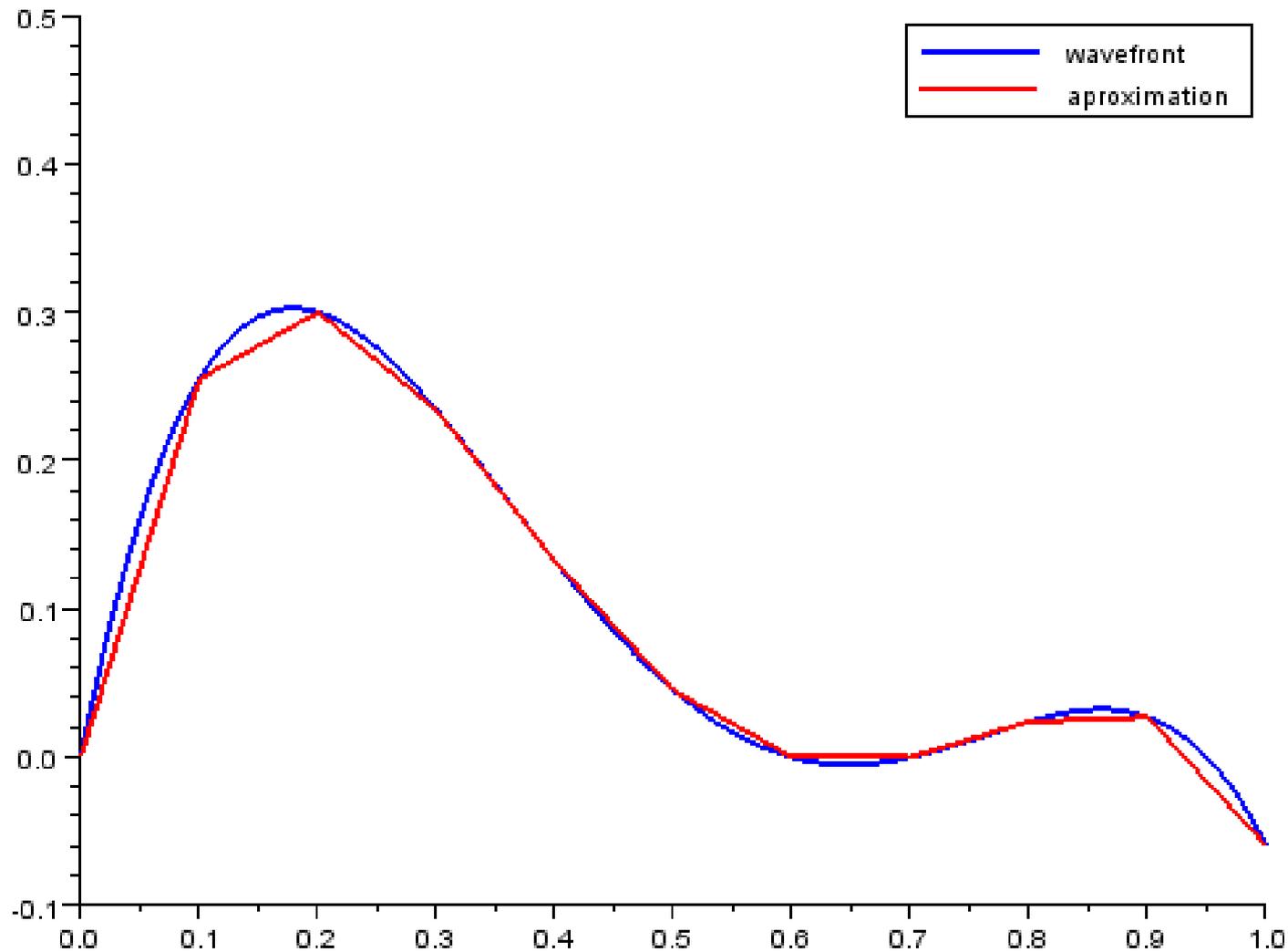
$$s = k \cdot c$$

$$s_e = c \cdot k + e/d$$

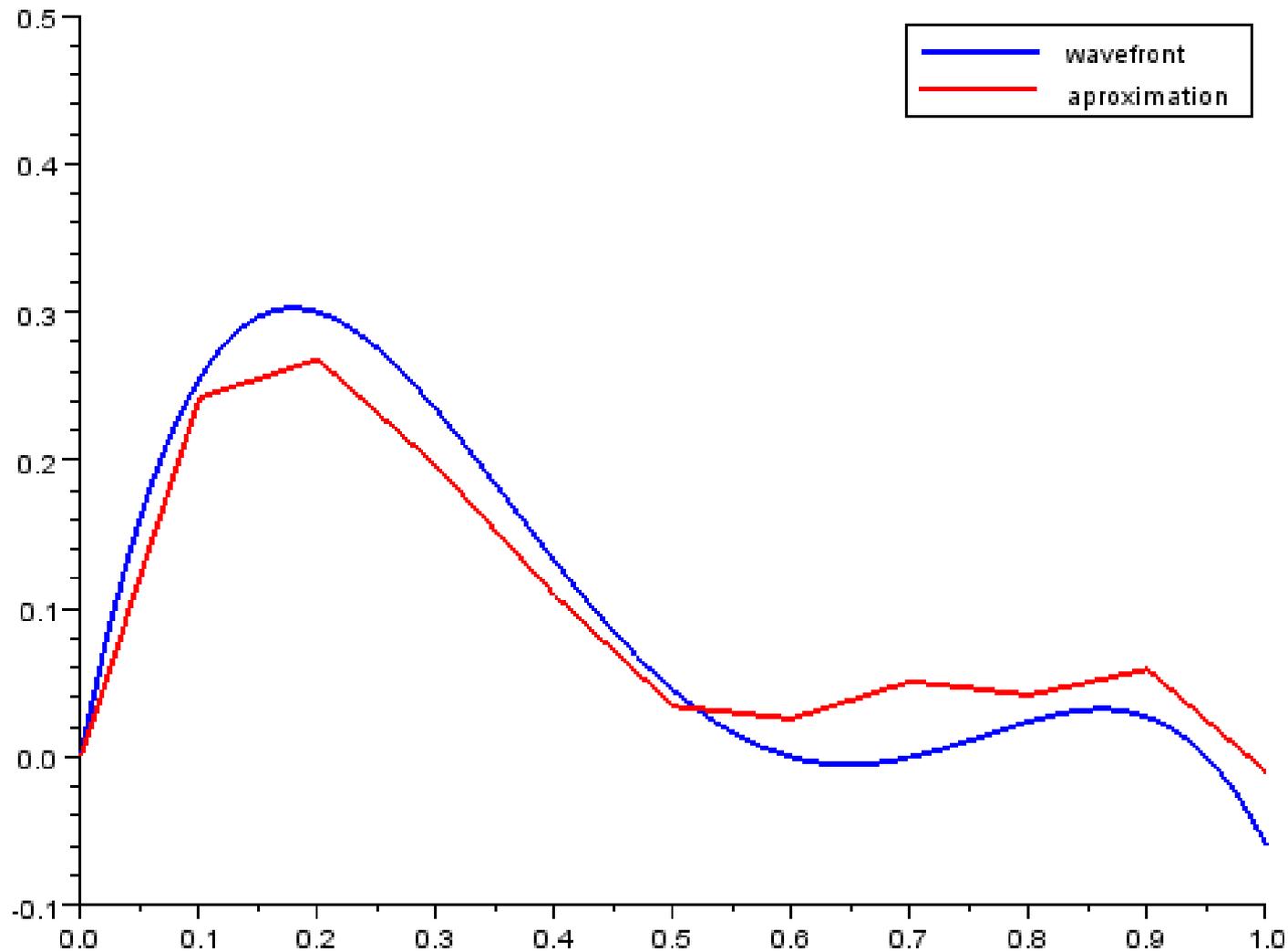
e...Zufälliger Wert in $[-e_{\max}, e_{\max}]$



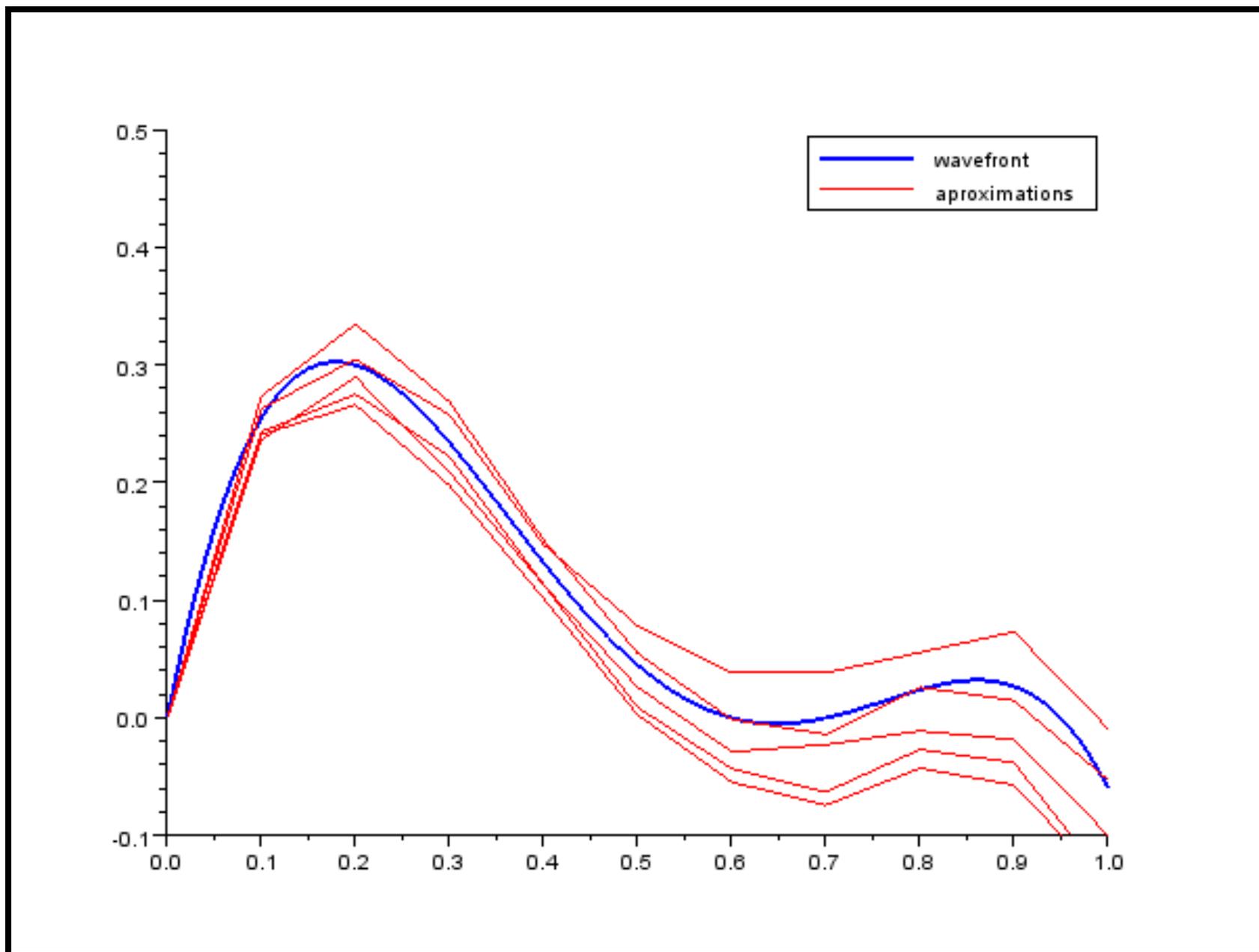
Approximation ohne Rauschen



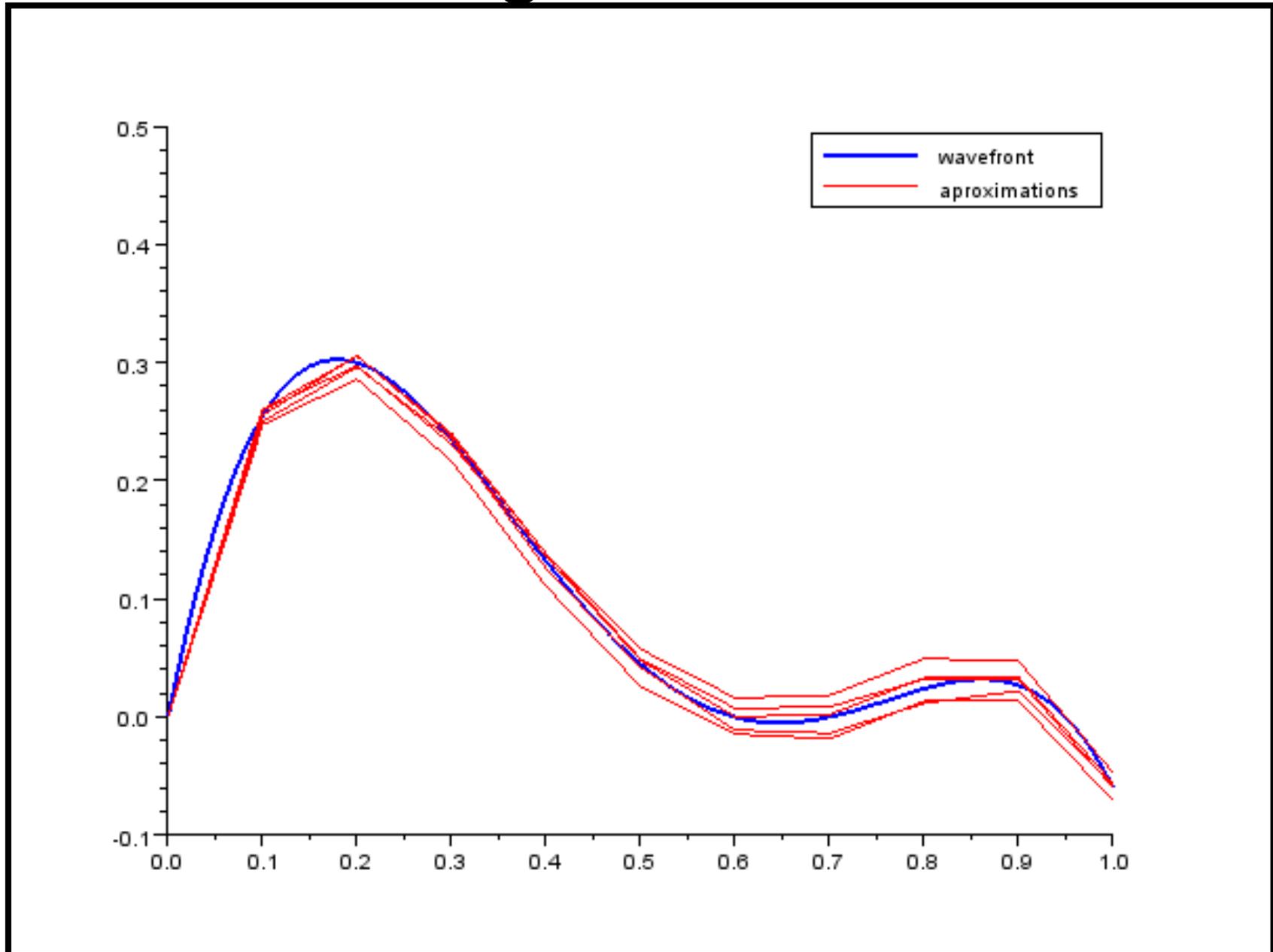
Approximation mit Rauschen



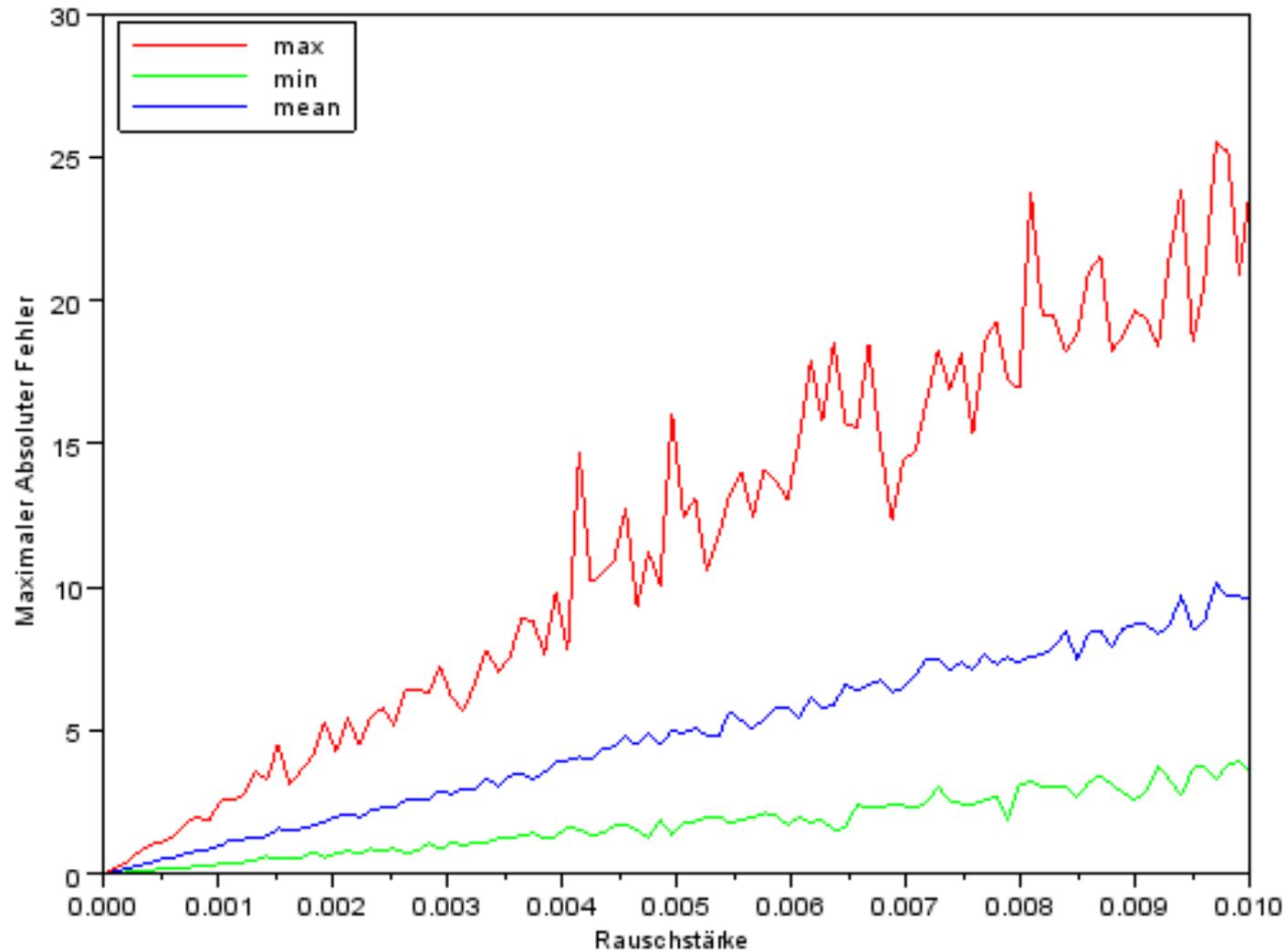
viel Rauschen



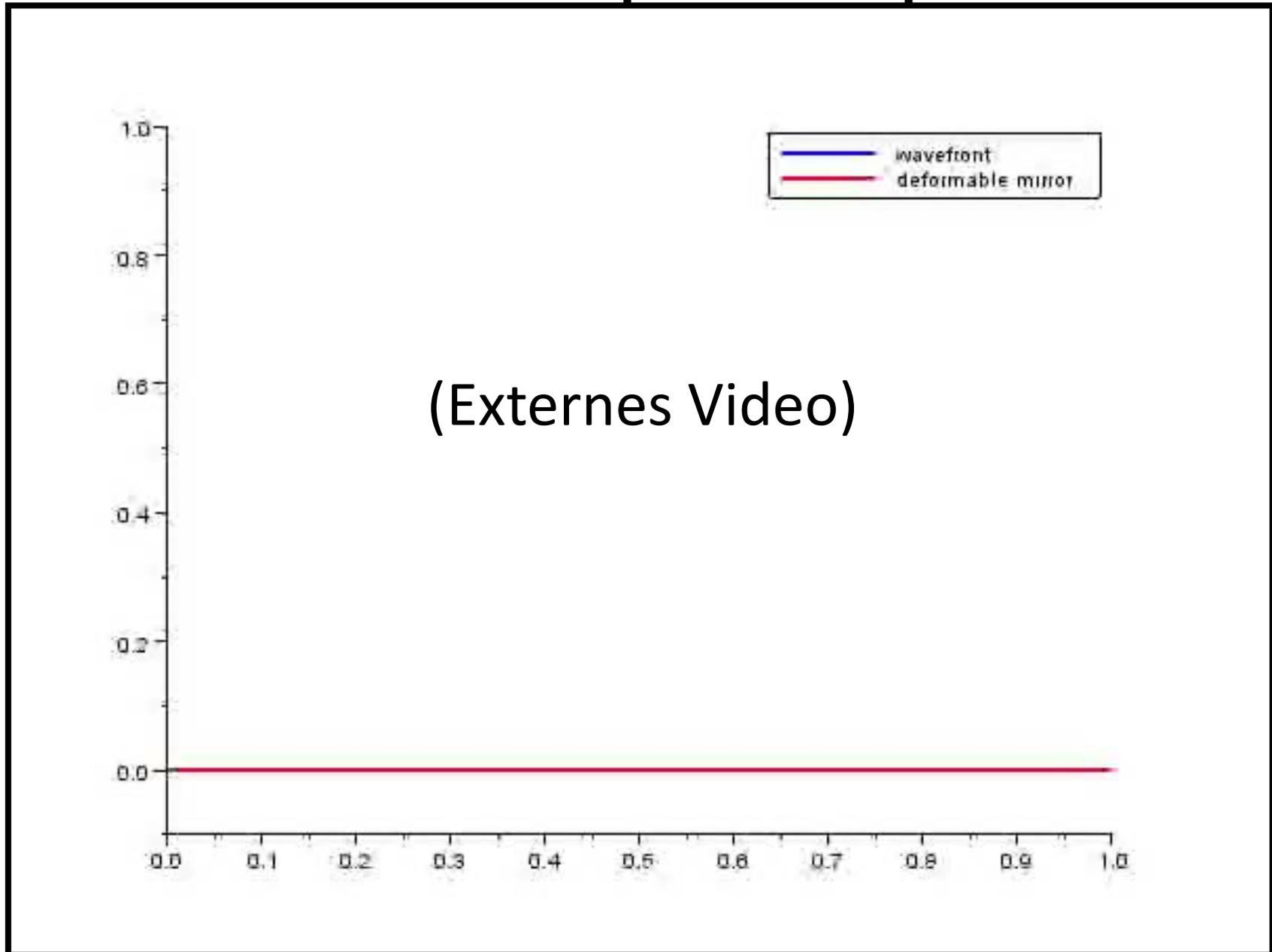
wenig Rauschen



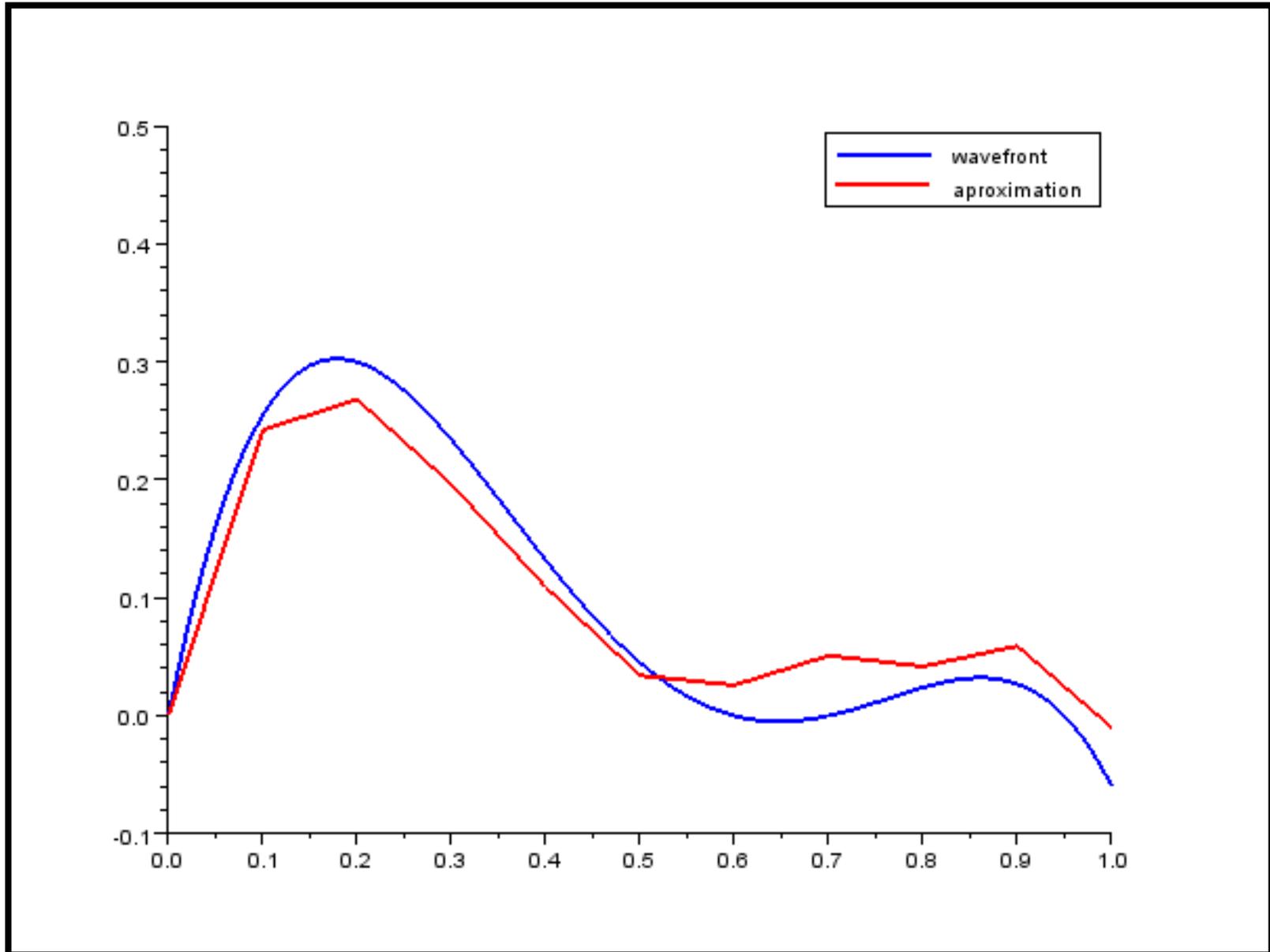
Analyse des Rauschens



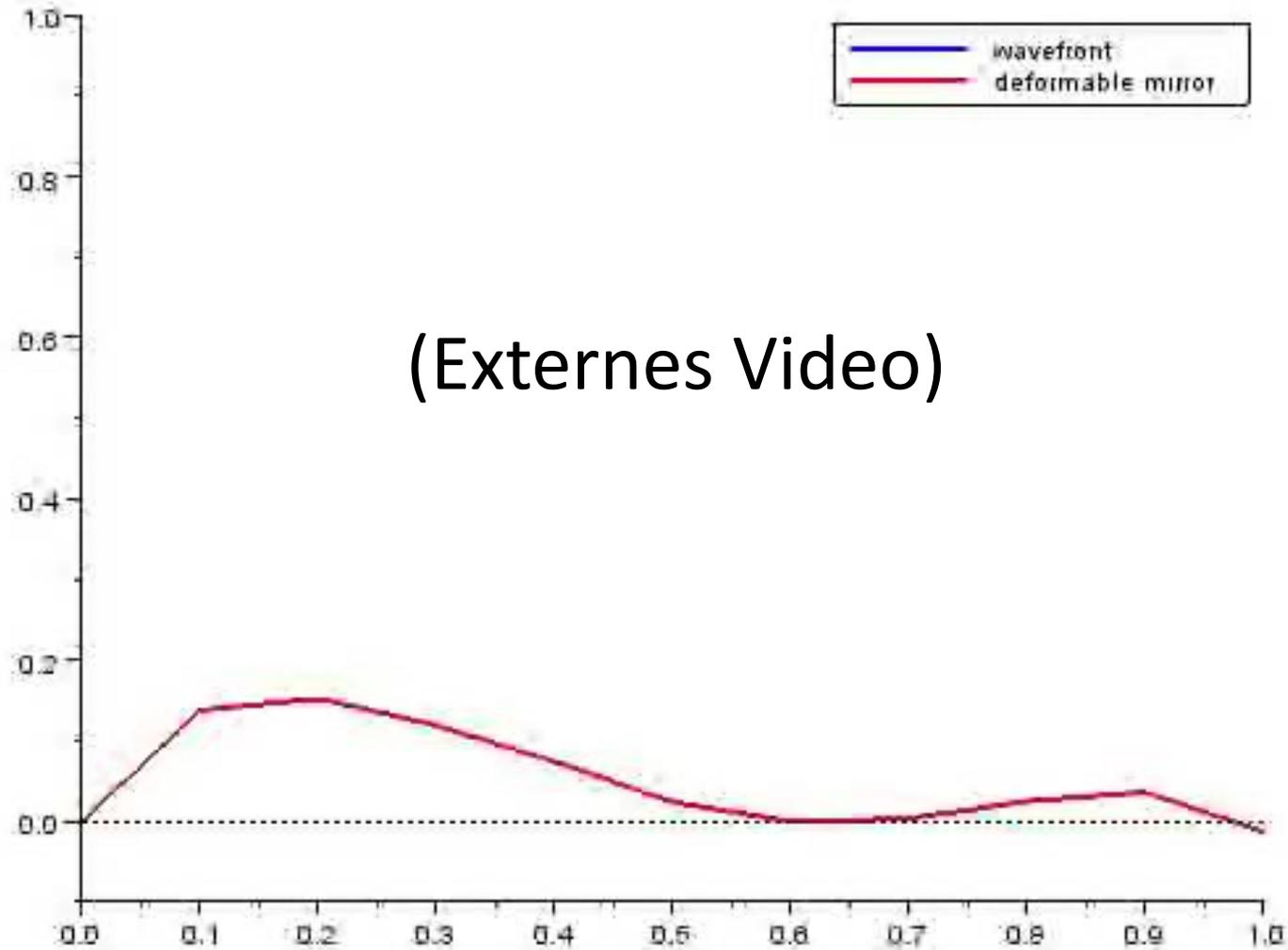
ohne Adaptive Optik



Aproximation von φ in



mit Adaptiver Optik



(Externes Video)

Ergebnis

