# Master Thesis

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# Nonparametric Regression



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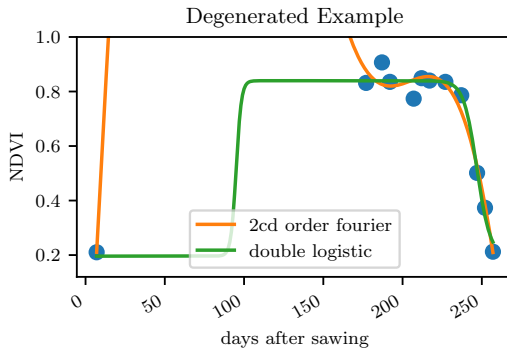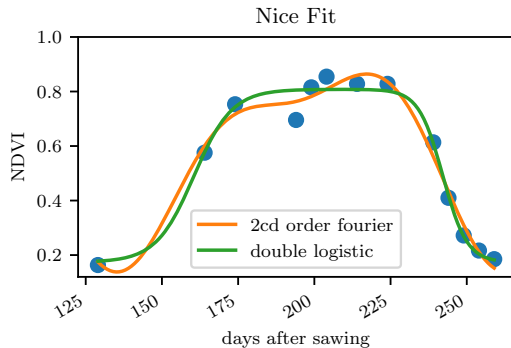
| | assumtpions | pros | cons | weights | bounded |
|---|---|---|---|---|---|
| Savitzky-Golay filter | – high frequencies are noise (low.pass filter) – equidistant points | | – cannot deal natively with missing data (need some interpolation) | no | yes |
| + NDVI | – upper envelope – vegetation cannot grow faster than some slope | – biological knowledge | – bad "upper envelope" since weights are not used for the estimation itselfe | (no) | yes |
| Loess | | | | | |
| Smoothing Splines | – 2cd derivative of function is integrable | – intuitive meaning of penalty – general assumptions – flexible shape | – unbounded | yes | no |
| B-Splines + Smooth | – function can be approximated by a linear combination of B-splines basis functions | – general assumtion – flexible shape | – unbounded – no intuitive meaning for smoothing | | no |
| Whittaker | | | | | |

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| | assumtpions | pros | cons | weights | bounded |
|---|---|---|---|---|---|
| (Gaussian) Kernel Smoothing | | – simple – general assumptions | – bandwidh: failes if there are big data-gaps | yes | yes |
| Double-Logistic | – function first increases then decreases – ndvi has a minimal value | – good for evergreen plants (if snow masks ndvi) –upper envelope | – parameterestimation can go seriously wrong – strange behaviour for long data-gaps | yes | yes |
| Universal Kriging | – function is a realization of a stationary gaussian process | – informative parameters – flexible | – regression to the mean – assumptions clearly not met | yes | yes |