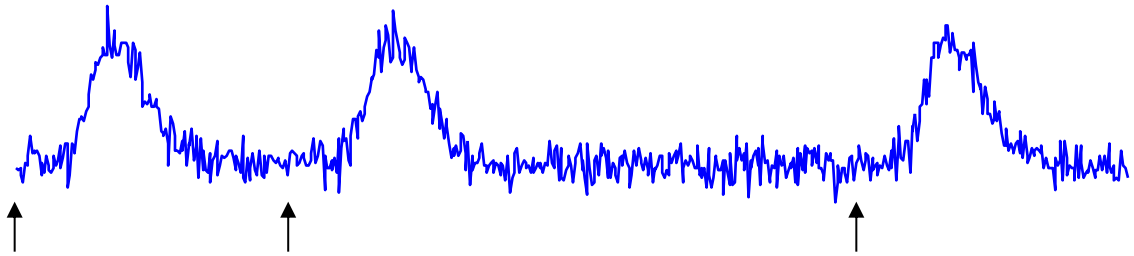
fMRI data analysis

Part 3: Deconvolution

Deconvolution

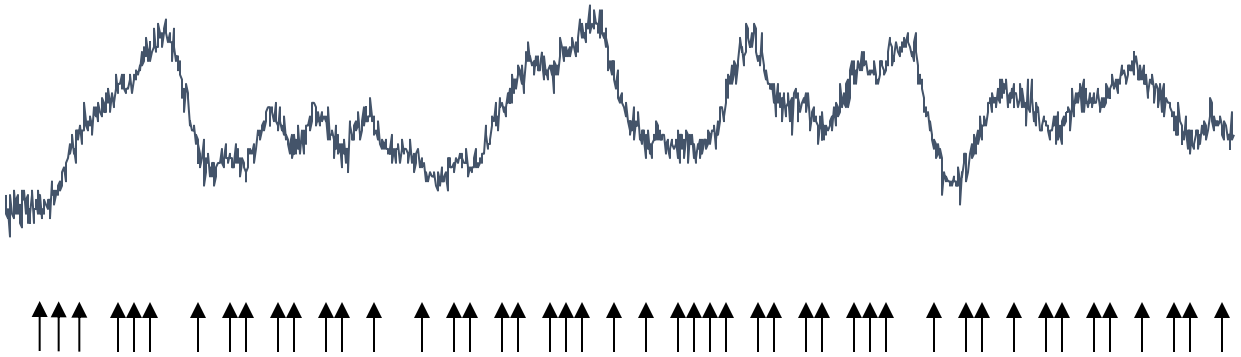


Are there any significant signal changes time-locked with my stimulus?

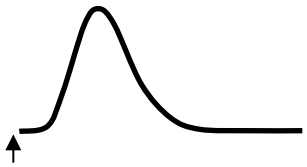
What do those changes look like?

(I'm not going to assume any particular shape of the ideal response)

Deconvolution



?



Multiple Regression

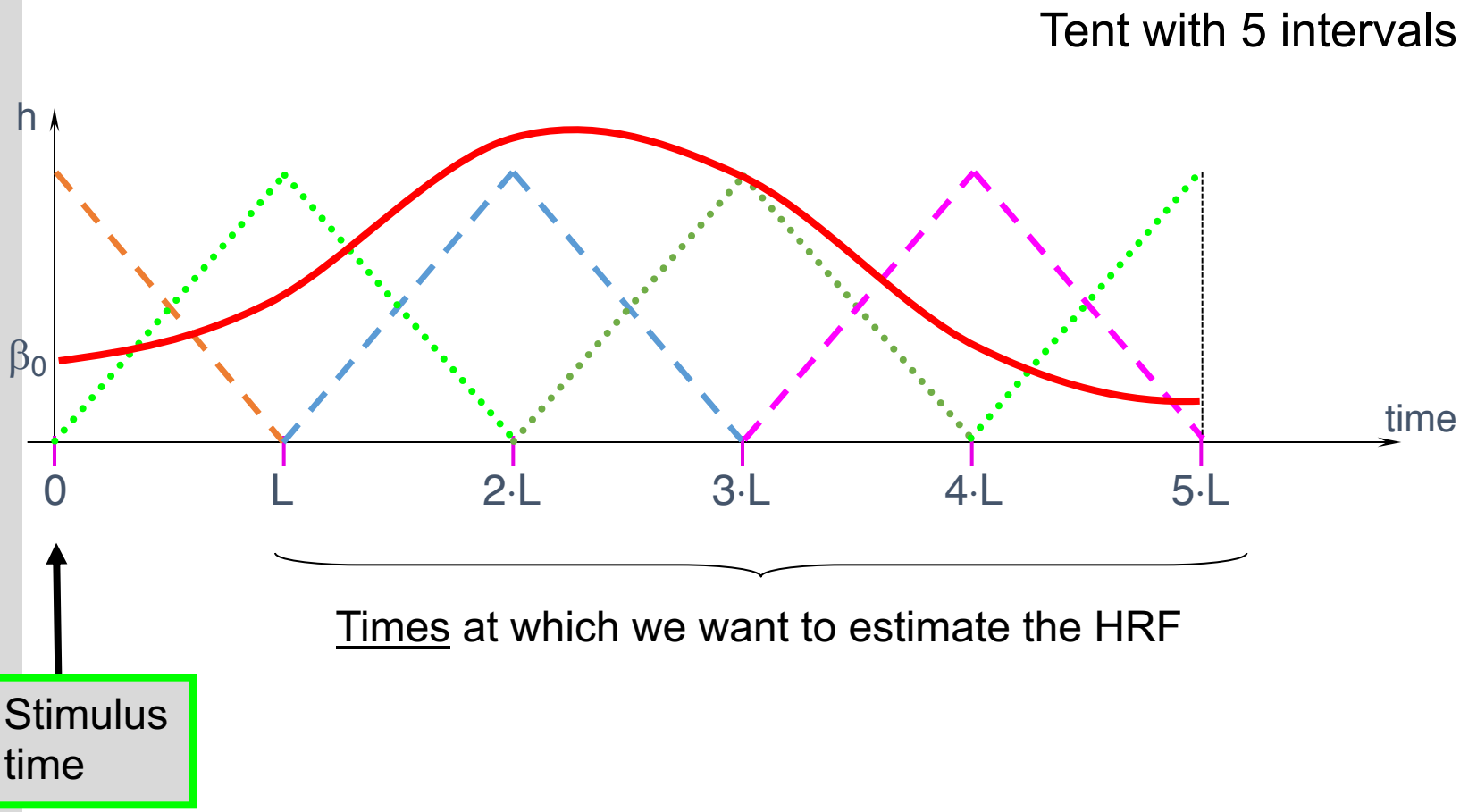
Fixed HRF shape

$h(t) = \beta_1 t^{8.6} e^{-t/0.547}$

Flexible HRF shape

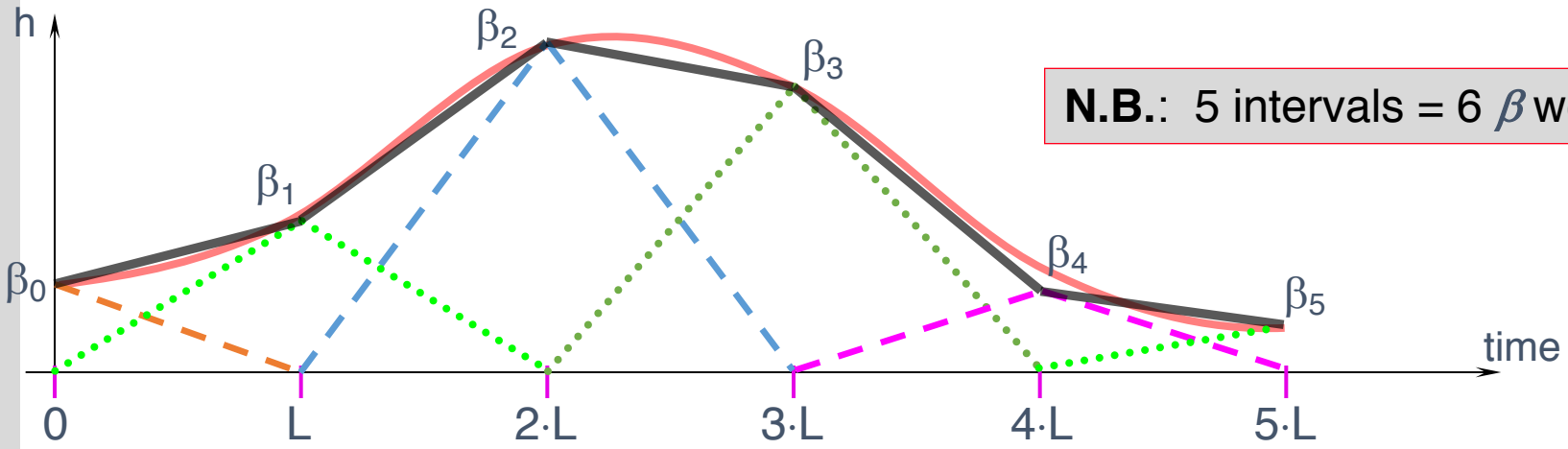
$h(t) = \beta_1 T(t) + \beta_2 T(t-\tau) + \ldots$

Tent functions



Tent functions

Tent with 5 intervals



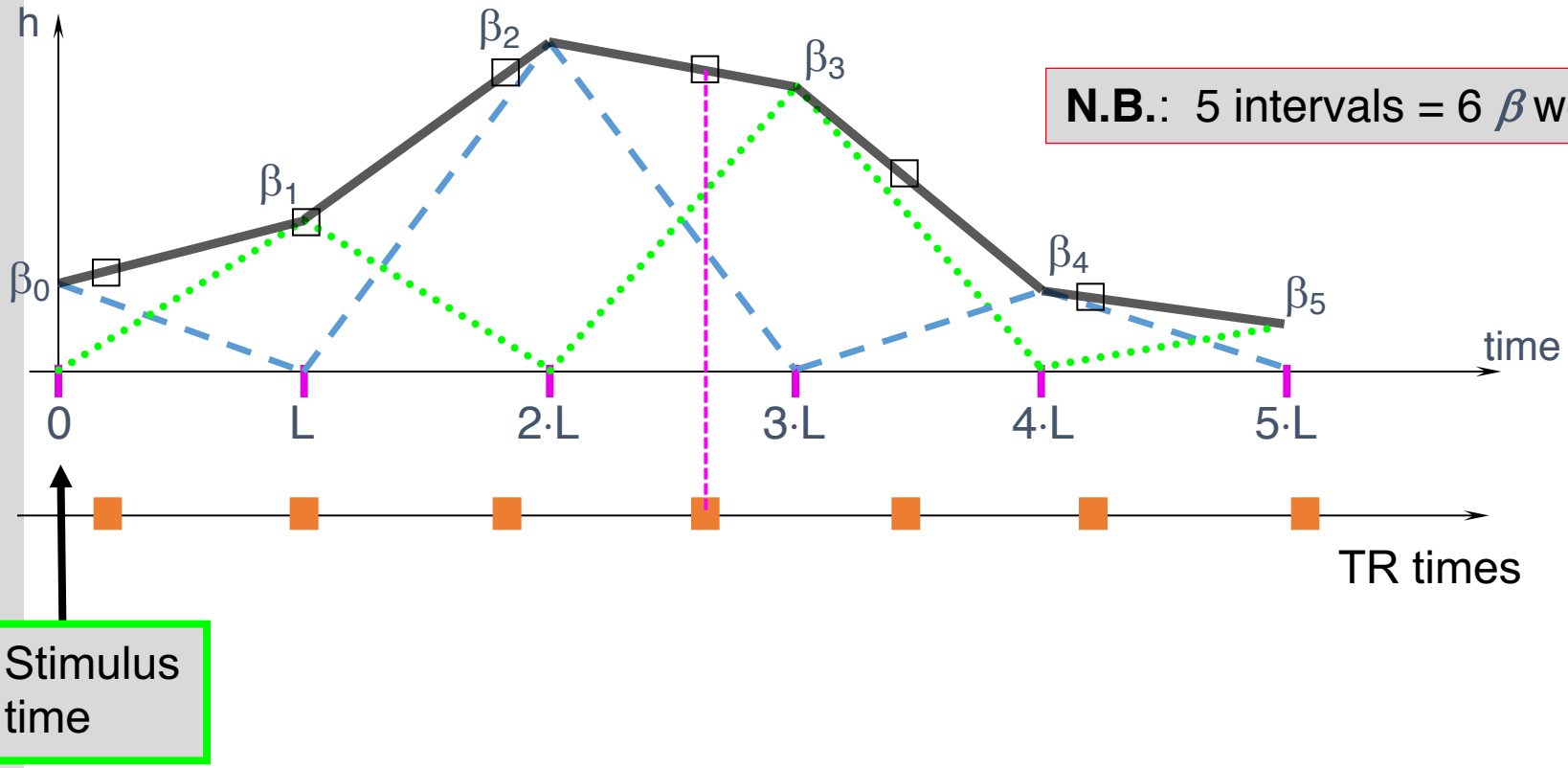
N.B.: 5 intervals = 6 β weights

Times at which we want to estimate the HRF

Stimulus time

Tent functions

Tent with 5 intervals



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Convolution

Multiple Regression

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Flexible HRF shape

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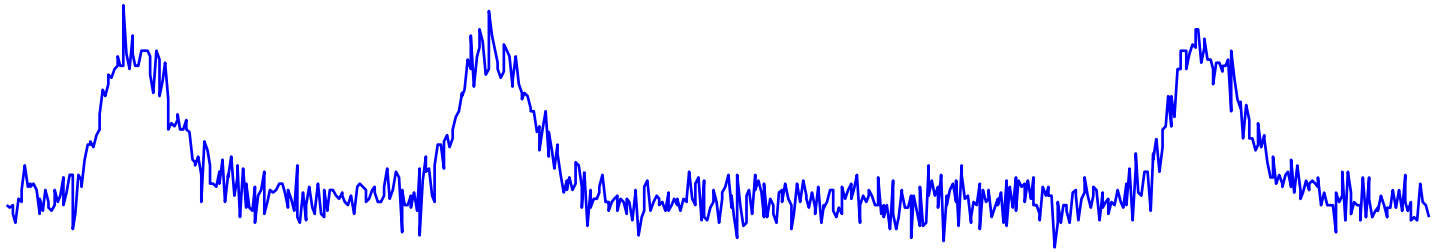
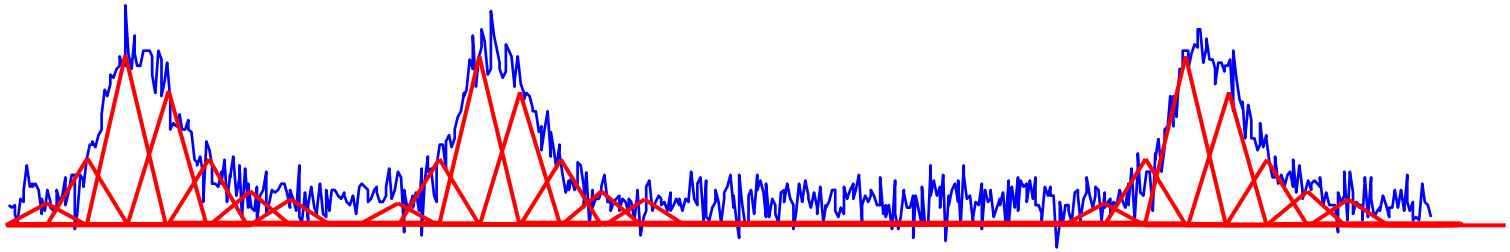
Deconvolution

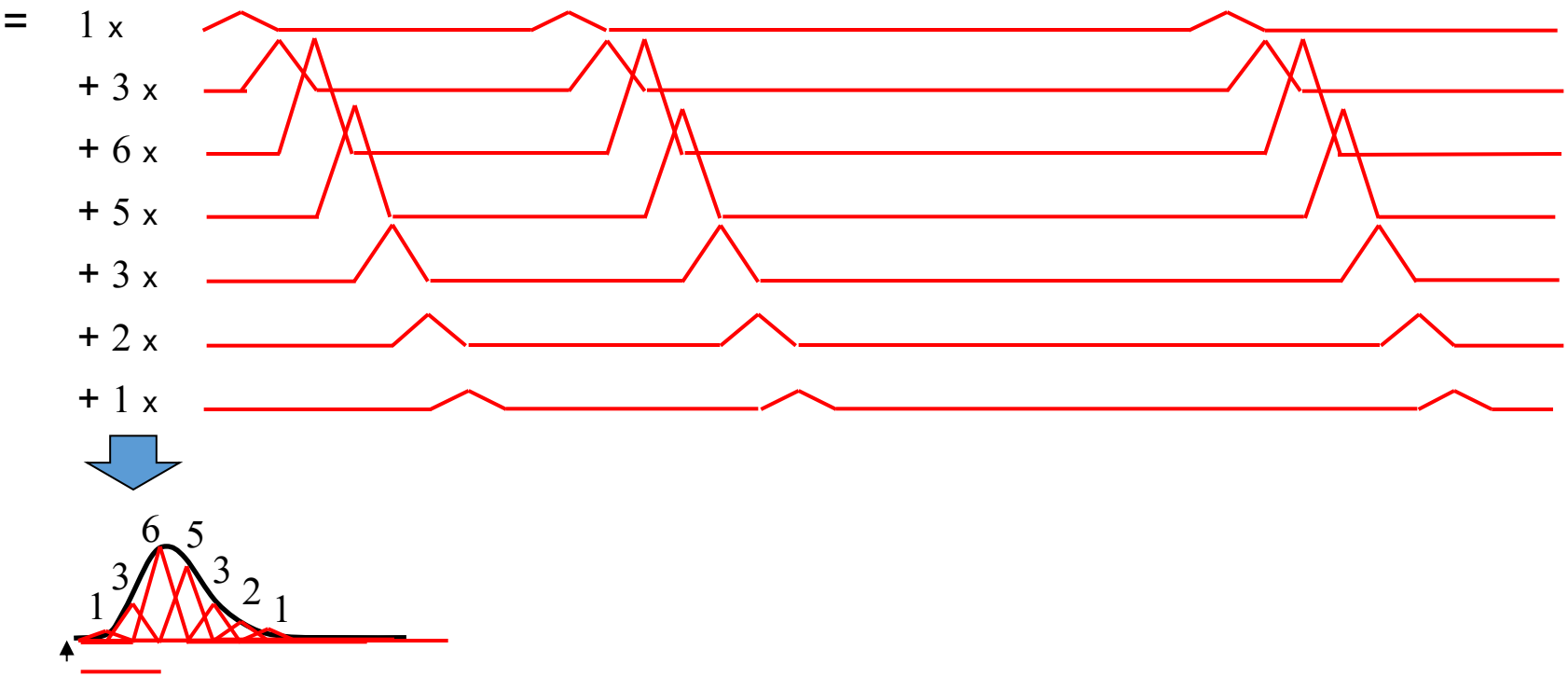
Fixed HRF



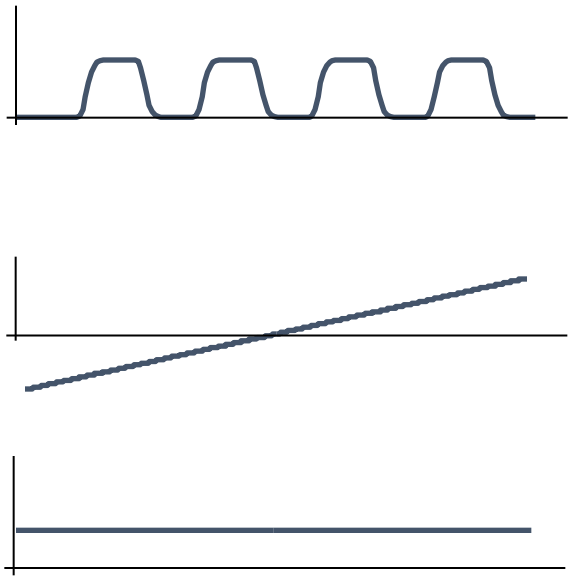
= β_1 x

Tent Functions

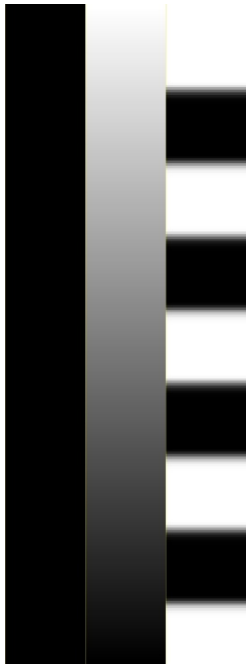




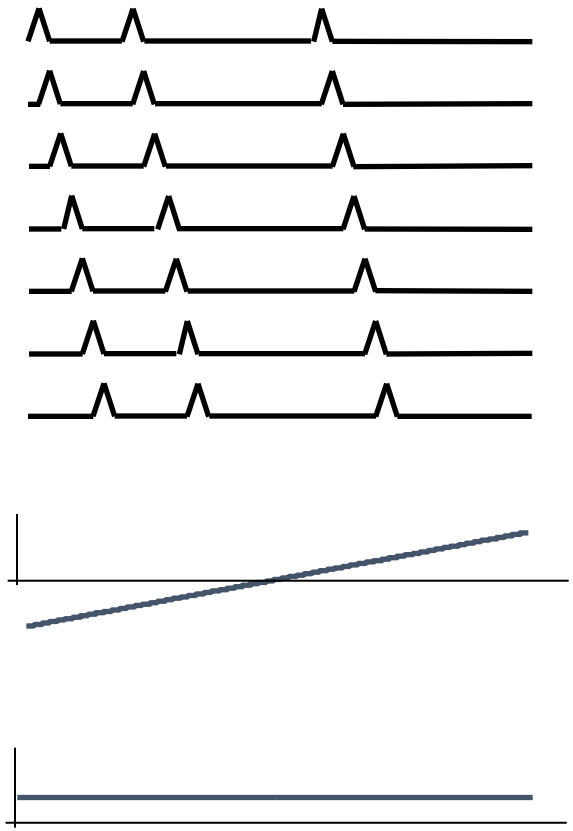
Regressors – 1 task vs. control



Design Matrix



Regressors – deconvolution (“tents”)



Design Matrix