The ‘Linear-Nonlinear’ model

Stimulus | Linear Receptive Field | Threshold & Nonlinearity

Firing Rate (spikes/sec)

Membrane Potential (Vm)

0 | 0.5 | 1 | 1.5 | 2

2.5

0 | 0.5 | 1 | 1.5

Firing Rate (spikes/sec)
The ‘Linear-Nonlinear’ model: Predicting sharpening of orientation tuning
The ‘Linear-Nonlinear’ model:
Predicts Cross-Oriention Suppression
(though not very well)
Linear receptive field in space and time
Linear response to sequence of noise

Threshold and Nonlinearity

Spikes
‘Spike Triggered Average’ or ‘reverse correlation’:

For each spike, go back and find the sequence of stimuli that preceded it and average all of these sequences together. With enough spikes, the average sequence that created a spike will be the linear receptive field.