

CGC7 Print Excerpt

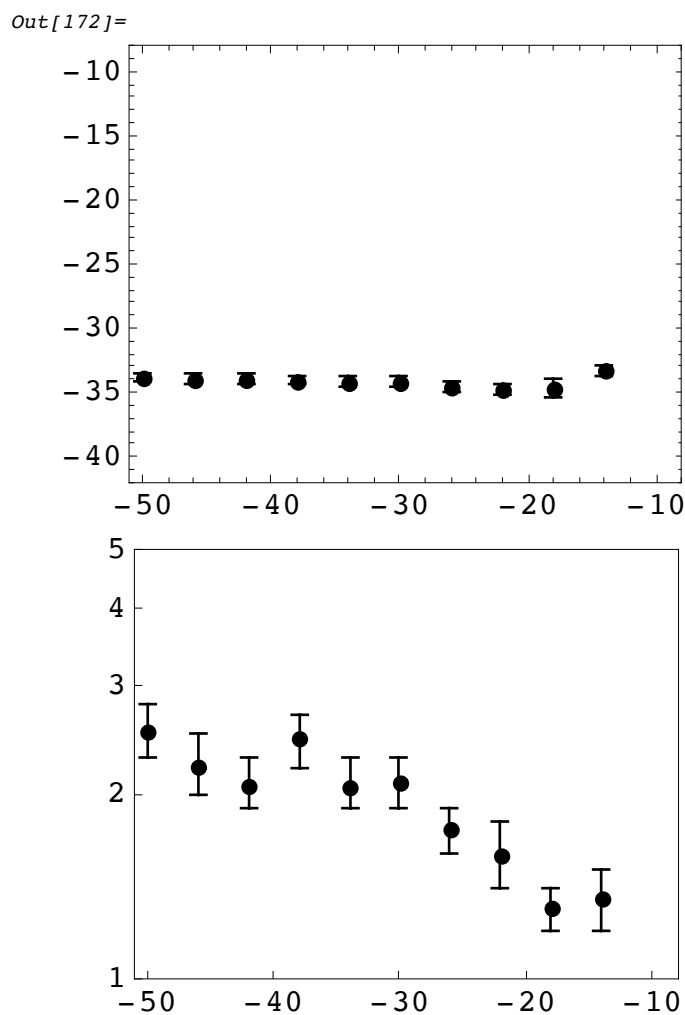
All illustrations mentioned in (but absent from) the paper, "An image-driven model for pattern detection, resistant to ~~Birdsall linearisation~~", should appear in this excerpt.

■ Threshold and slope

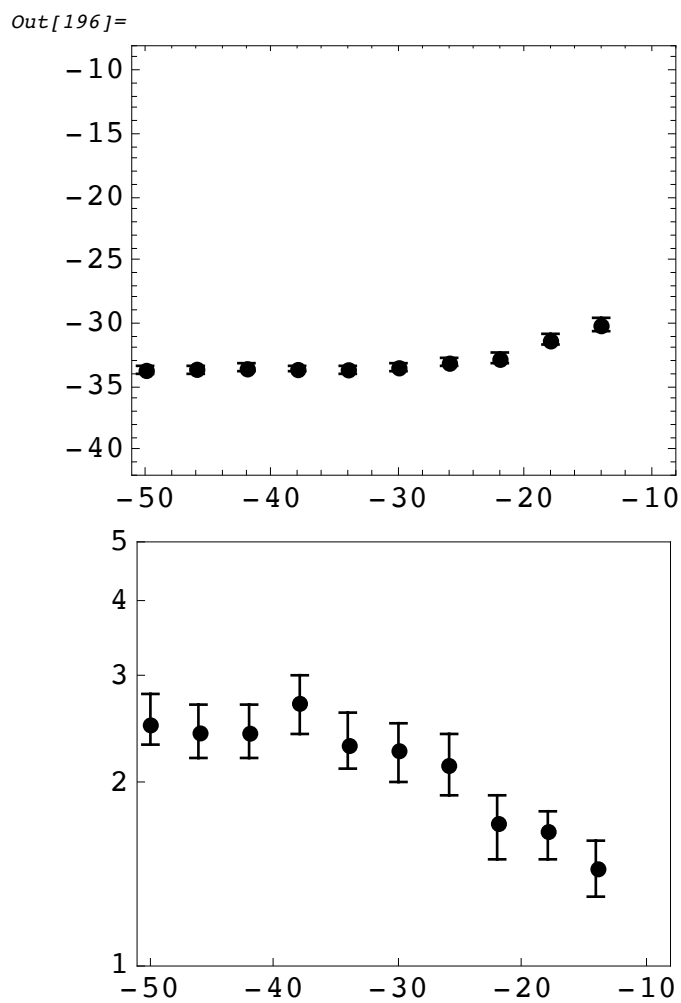
In this section models were tested with 4,096-trial Quest+ (Watson, 2017) staircases, one for each of 10 logarithmically spaced noise contrasts.

■ Testing thresholds8 (Old fits, New fits 2 & 3)

□ fit to JYS from fitGabors16v3 and QuestPlus (New fits 2)



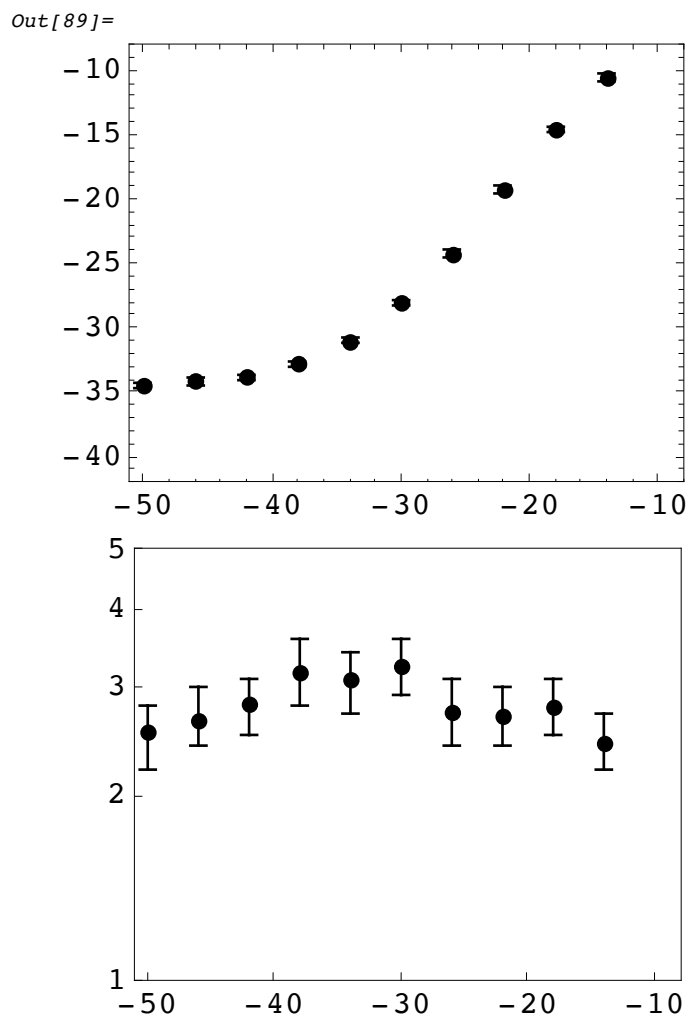
□ fixing position, with fit to JYS from fitGabors16v3 and QuestPlus (New fits 3)



■ Testing alternateDecisionVariable (New fits 4)

□ Using fitGabors16 v 0.3 fit to KMF (New fits 4)

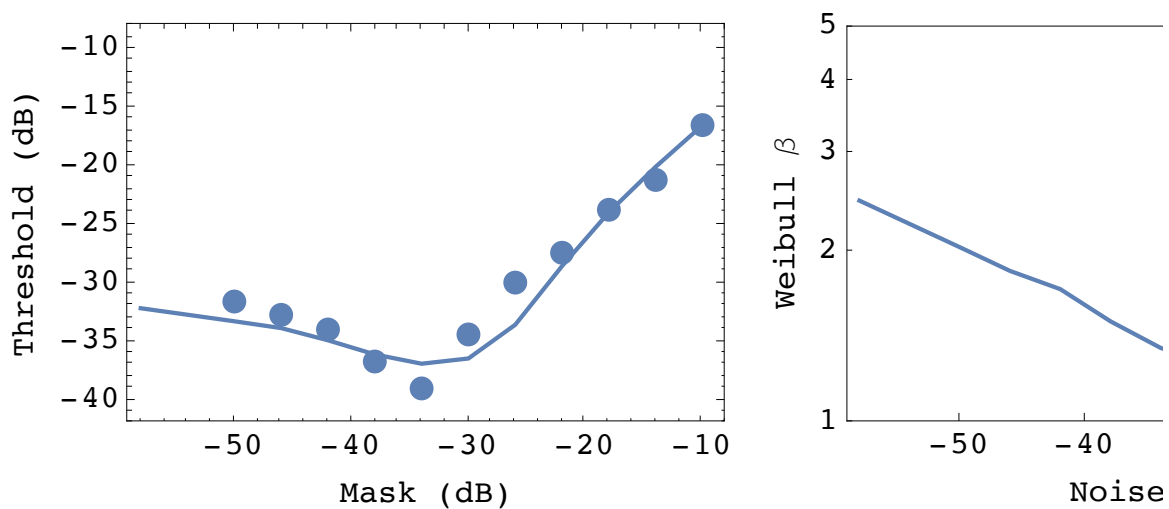
Using QuestPlus and independent samples of noise:



Pedestal masking, for Tim:

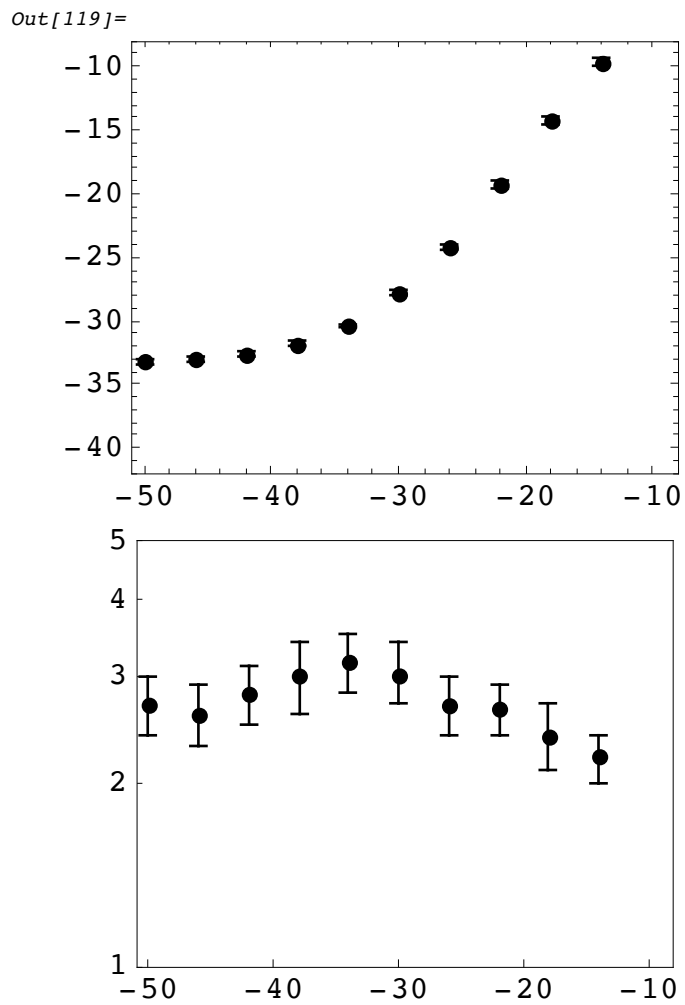
NB: psychometric function for detection is steeper than psychometric function for discrimination with -50 dB pedestal:

Out[209]=



□ Using fitGabors16 v 0.3 fit to JYS (New fits 4)

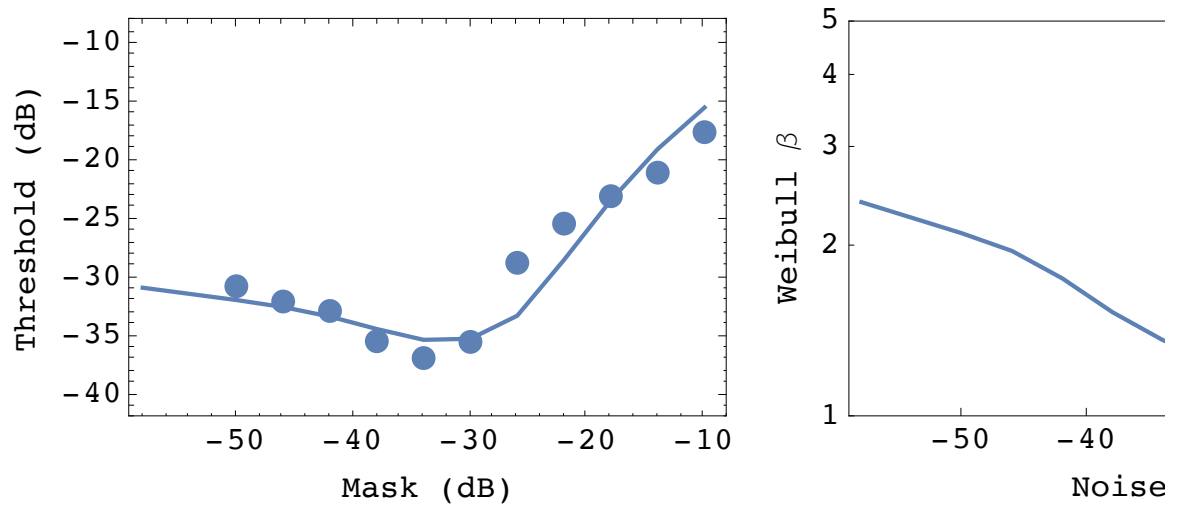
Using QuestPlus and independent samples of noise:



Pedestal masking:

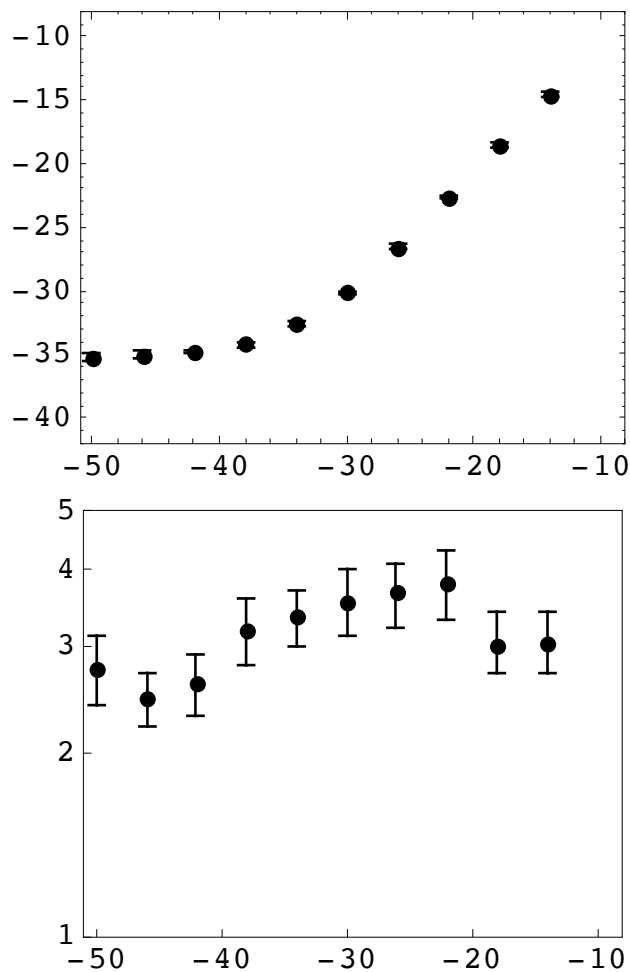
NB: psychometric function for detection is steeper than psychometric function for discrimination with -50 dB pedestal:

Out[255]=



□ Using fitGabors16 v 0.3 fit to KMF and QuestPlus, but halving sensor bandwidth

Out[125]=



■ Exploring sensor dominance

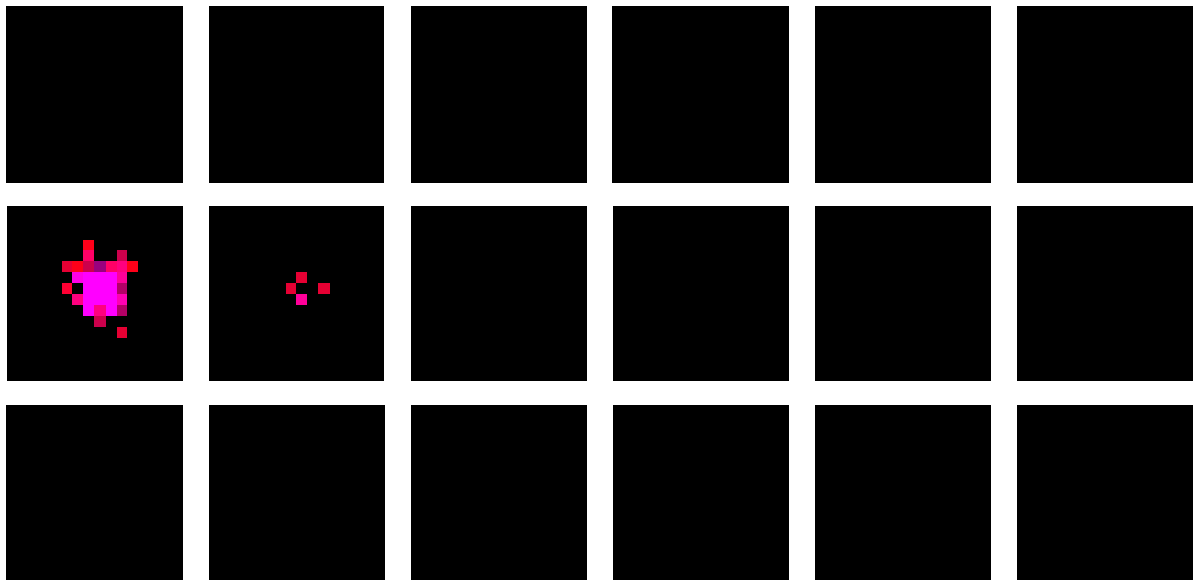
In this section, models were subjected to 300 detection experiments, each of which contained a different sample of twinned noise in each of its 200 trials. There were 30 experiments for each of

10 logarithmically spaced noise contrasts. On each trial, target contrast was determined using the Quest routine (Watson & Pelli, 1983).

■ Testing thresholds8 (New fits 2)

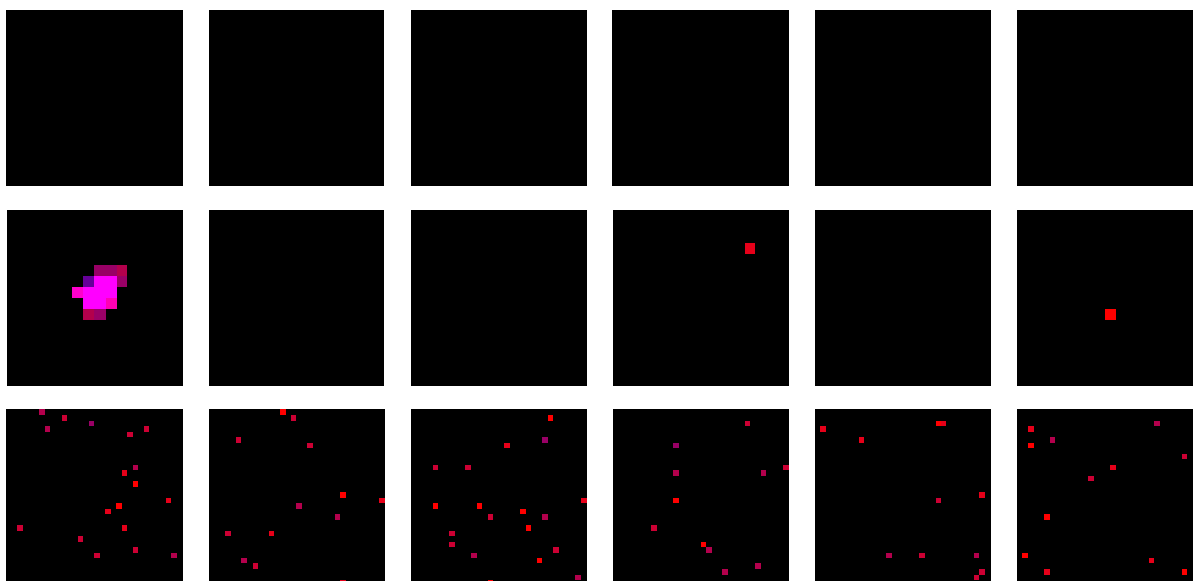
□ fit to KMF from fitGabors16v3

Out[204]=

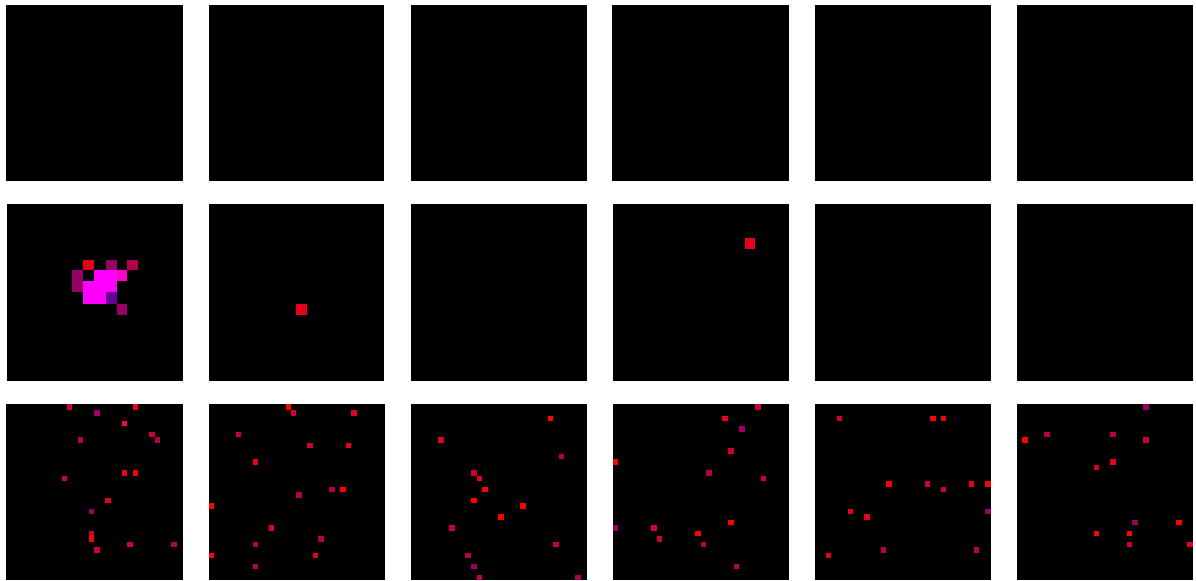


Most-active units in Watson and Solomon's original model's best-fit to KMF ('New fits 2', twinned noise dB=Range[-50,-14,4]). Coloured points show positions of the largest response at threshold. Colour corresponds to noise level (blue:low, red:high). Top level of the pyramid at the top. Unsurprisingly, most maxima occur in or near the best-tuned sensor (purple blob at left of middle row).

Out[205]=

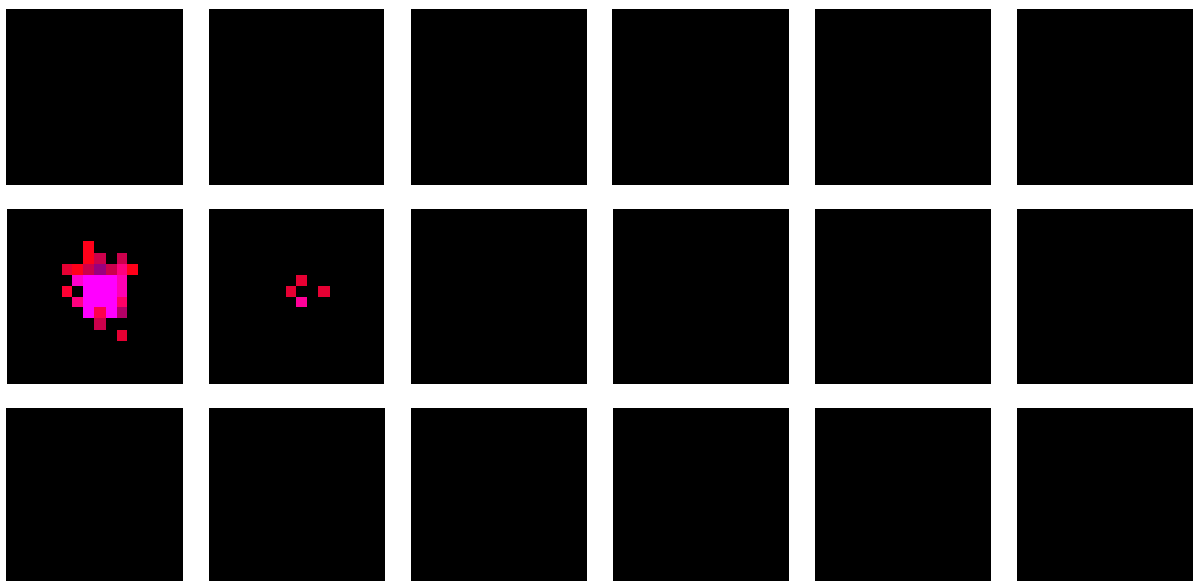


Most-active units in Watson and Solomon's original model's best-fit to KMF before

inhibition.`Out[206]=`

Positions with largest amount of inhibition in Watson and Solomon's original model's best-fit to KMF (dBnoise=Range[-50,-14,4]).

□ **fit to JYS from fitGabors16v3**

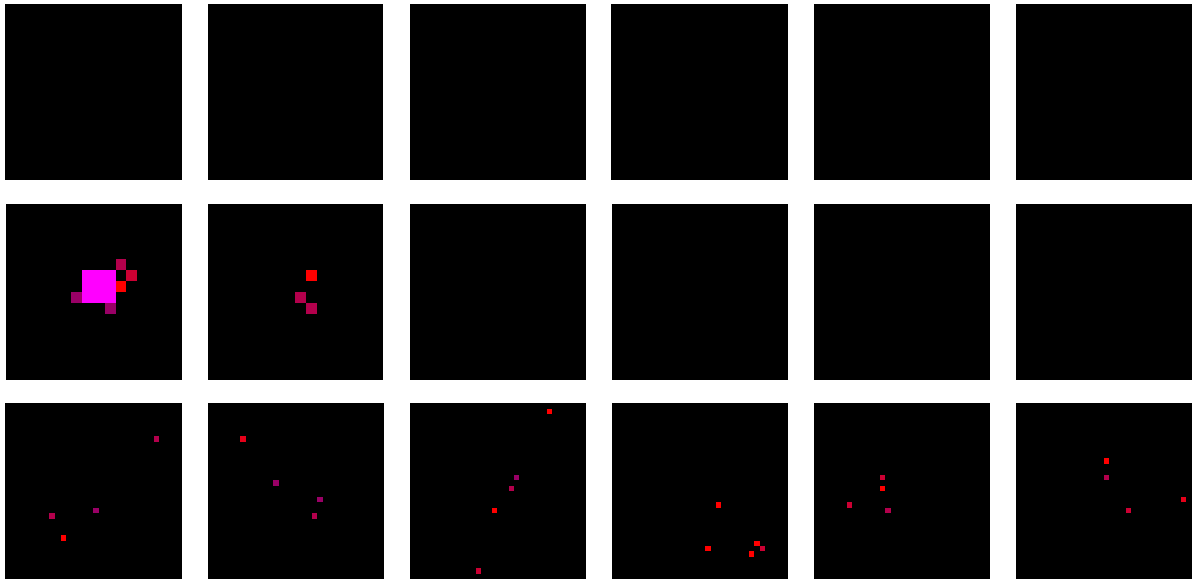
`Out[209]=`

Most-active units in Watson and Solomon's original model's best-fit to JYS ('New fits 2', twinned noise dB=Range[-50,-14,4]). NB: Same samples of noise as KMF simulation.

■ Testing alternateDecisionVariable (New fits 4)

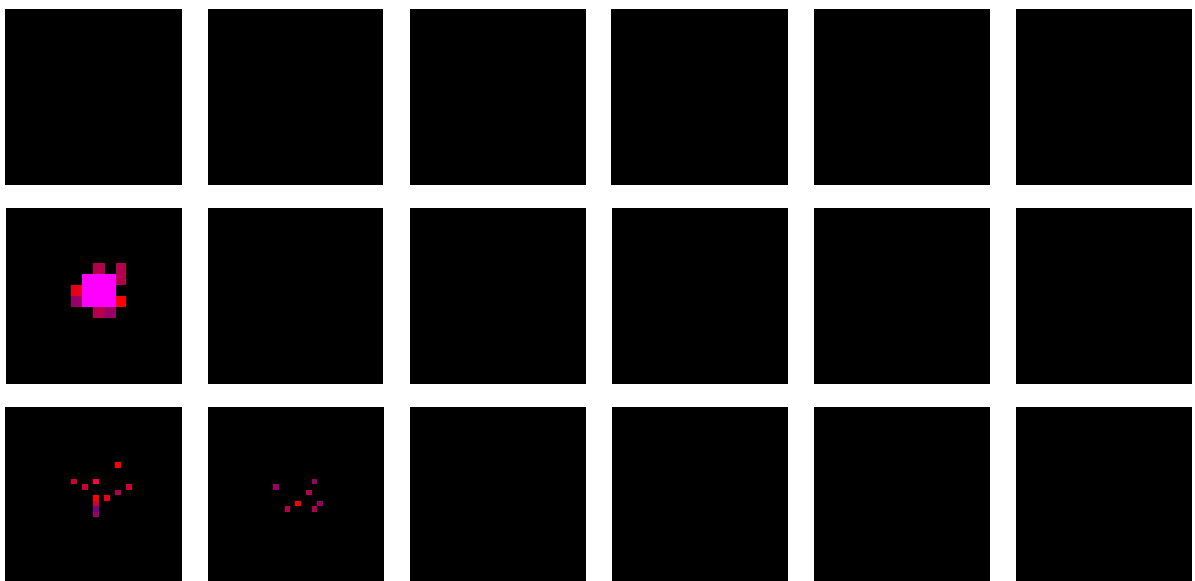
□ Using fitGabors16 v 0.3 fit to KMF (New fits 4)

Out[86]=



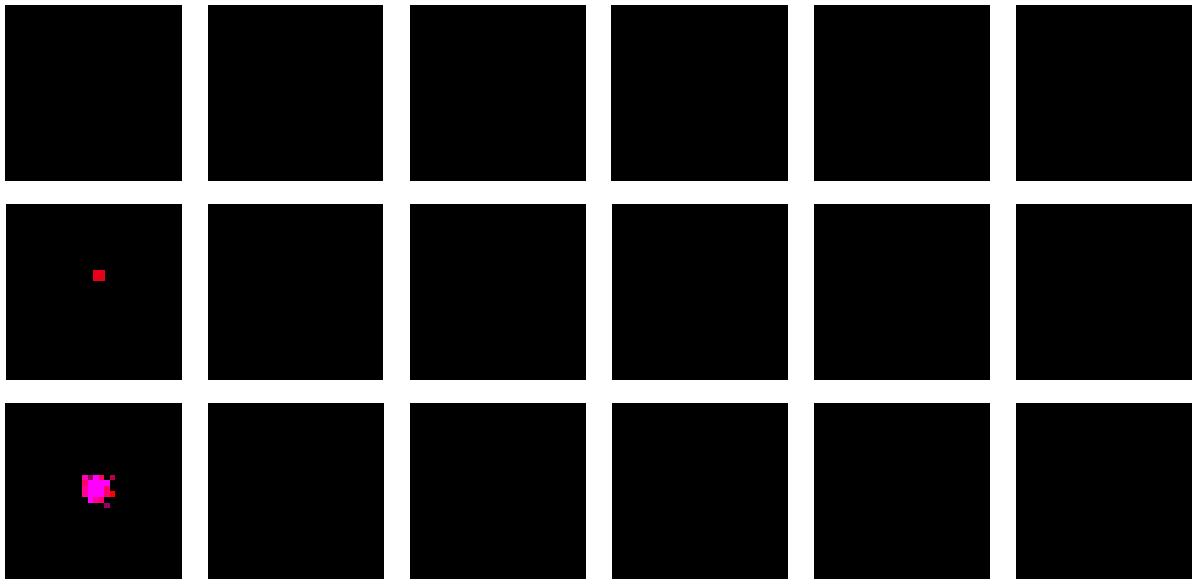
Most-active units in variant's best-fit to KMF ('New fits 4', twinned noise dB=Range[-50,-14,4]). Coloured points show positions of the largest response at threshold.

Out[88]=



Most-active units in variant's best-fit to KMF before inhibition. Compared with New fits 2, this one has fewer maxima in orthogonally tuned sensors.

Out[89]=

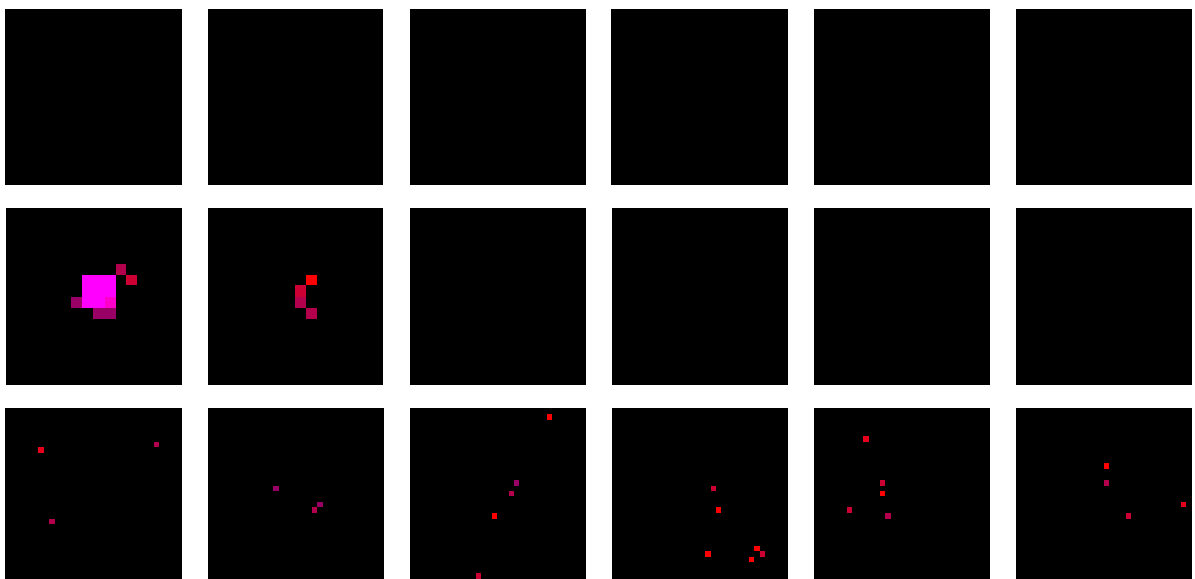


Positions with largest amount of inhibition in variant's best-fit to KMF

(dBnoise=Range[-50,-14,4]). Unlike the corresponding figure for New fits 2, this figure shows that most inhibition comes from the the sensor tuned to twice the target's frequency, even in the absence of external noise. This is directly attributable to the variant's relatively large sensor bandwidth. Here's a question: would the variant lose its immunity to ~~Birdsall~~ linearization if sensor bandwidth were halved (and all the other parameters were held constant)? Answer: no. On the other hand, we know that restricting bandwidth to this low value severely reduces the variant's goodness of fit (see Threshold and slope, Testing alternateDecisionVariable (New fits 4), Using fitGabors16 v 0.3 fit to KMF and QuestPlus, but halving sensor bandwidth).

□ Using fitGabors16 v 0.3 fit to JYS (New fits 4)

Out[193]=



Most-active units in variant's best-fit to JYS ('New fits 4', twinned noise dB=Range[-50,-14,4]). Coloured points show positions of the largest response at threshold.