Shape of the tuning curve

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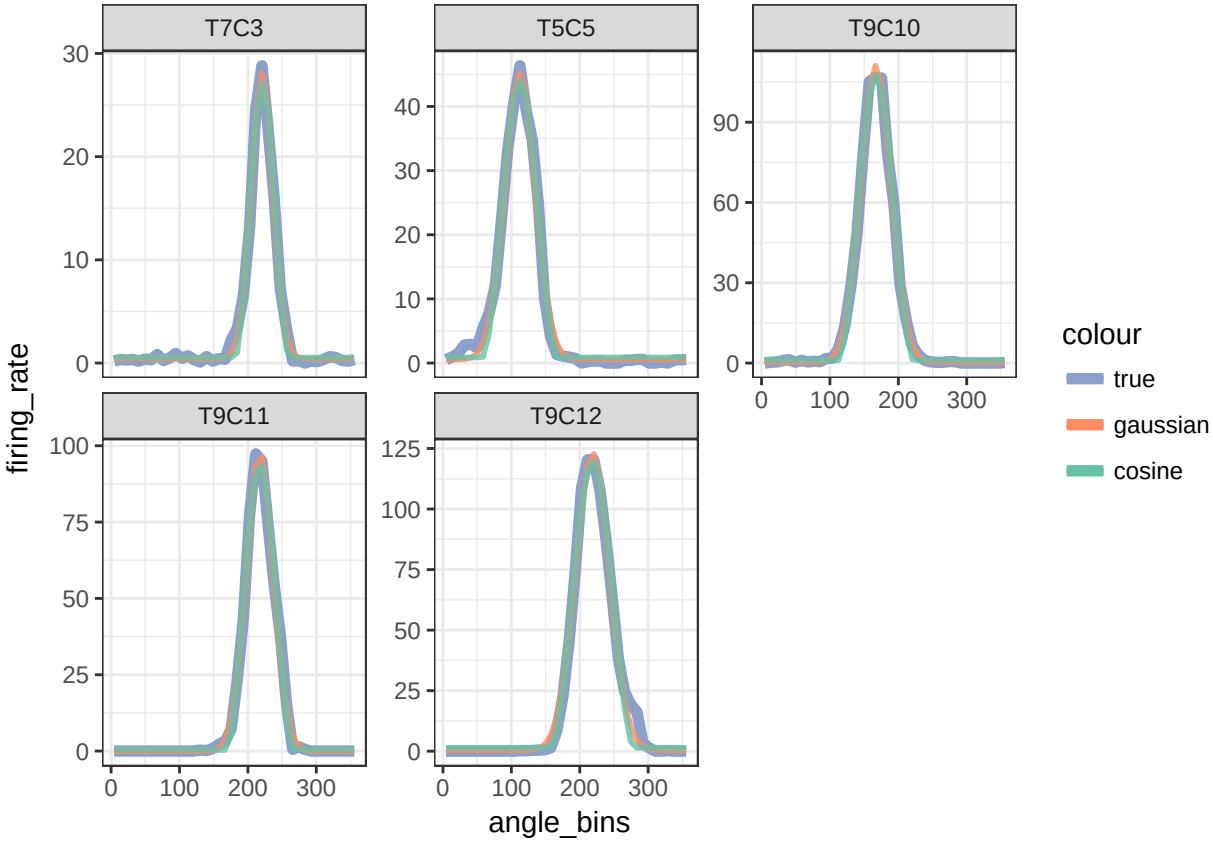
For each of the 10 neurons found in the previous project a guassian and cosine function was fit.

Cortex cell model

Thalamus cell model



Both models managed to fit a curve relatively well to the actual tuning curve. The two models were then compared by calculating the root mean squared error.

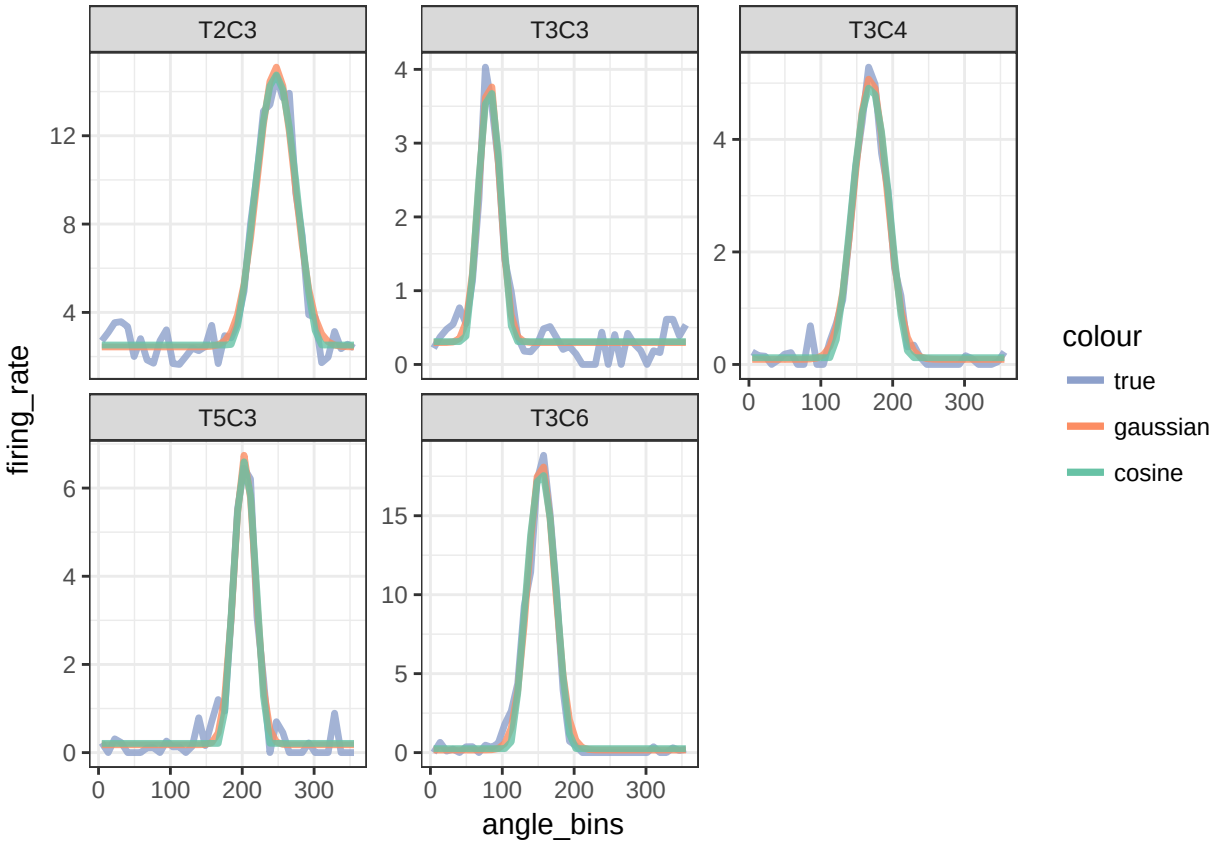
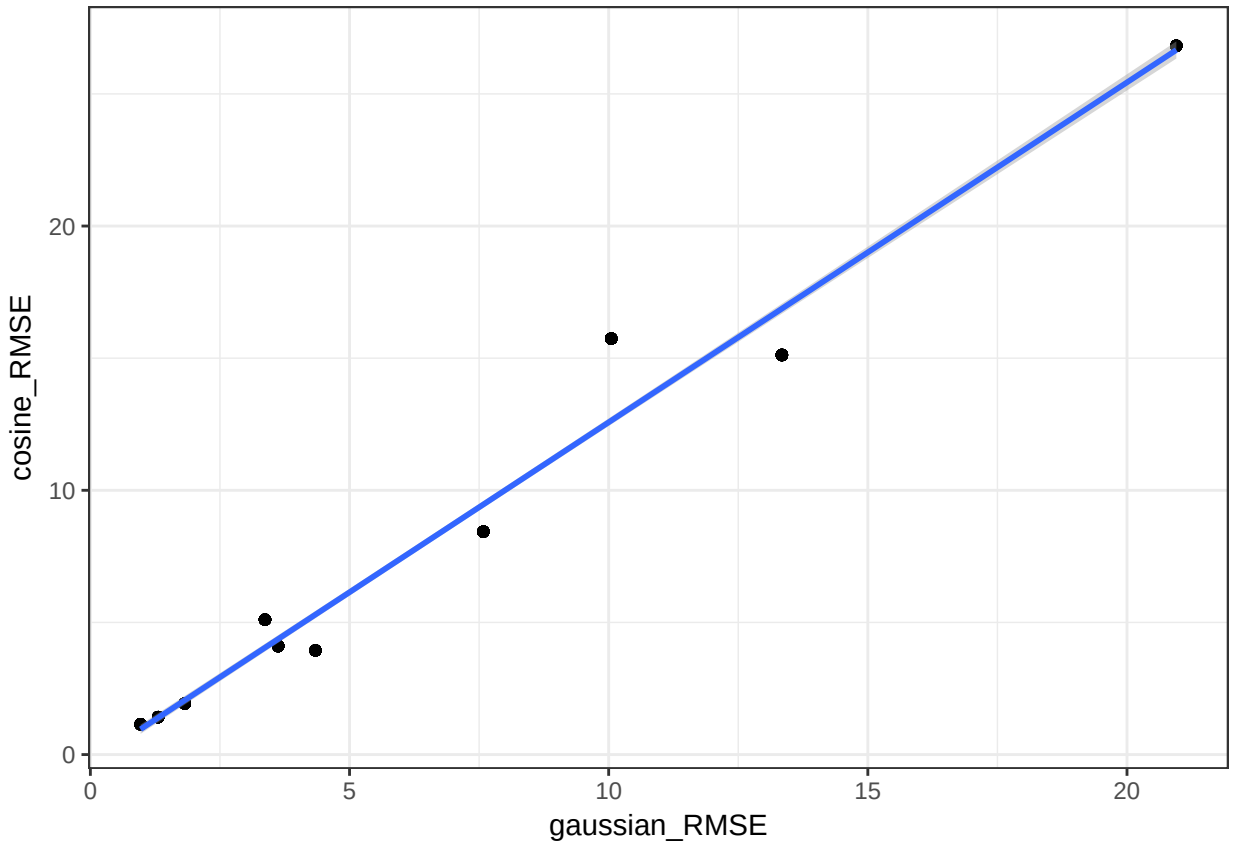

T2C3
T3C3
T3C4
T5C3
T3C6
firing_rate
angle_bins
colour
true
gaussian
cosine

Figure 1:

RMSE plot



Continous attractor models suggest that the cosine model should fit best, while the learning model suggests that the gaussian model should fit best. As the gradient of the line of best fit is less than 1 the plot above suggests that the gaussian model and thus the learning model is the best explanation for head direction cells. However since this analysis is done on only 10 cells and the difference in RMSE is relatively small, these results are not conclusinve