1. (a) [7 pts.] If associative memory $M$ is made from one cue $u$ and two targets $v_1$ and $v_2$:

$$M = \begin{bmatrix}
0.60 & 0.0 & 0.0 & 0.0 & 0.0 \\
0.0 & 0.0 & 0.0 & 0.0 & 0.0 \\
0.0 & 0.0 & 0.0 & 0.0 & 0.0 \\
0.0 & 0.0 & 0.0 & 0.0 & 0.0 \\
0.80 & 0.58 & 0.0 & 0.58 & 0.58 \\
\end{bmatrix}$$

what is the result of cueing $M$ with $u$? (HINT: You don’t need to calculate the matrix!)

(b) [3 pts.] Describe the result in a sentence in terms of $v_1$ and $v_2$. 

\[ \text{result} = \begin{bmatrix}
\end{bmatrix} \]
2. (a) [7 pts.] If associative memory $M$ is made from cues $u_1$ and $u_2$ and targets $v_1$ and $v_2$:

$$M = \begin{pmatrix}
0 & 0.60 & 0.80 \\
0.60 & 0 & 0.80 \\
0 & 0 & 0.60 \\
0 & 0 & 0
\end{pmatrix} + \begin{pmatrix}
0 & 0.60 \\
0 & 0 \\
0 & 0.80 \\
0 & 0
\end{pmatrix}$$

what results from cueing $M$ with a mixture of $0.3u_1 + 0.7u_2$? (You needn’t calculate the matrix!)

(b) [3 pts.] Describe the result in a sentence in terms of $v_1$ and $v_2$. 
3. (a) [7 pts.] If a filter $F$ is made from auto-associated vectors $v_1$ and $v_3$ (NOTE variable names!):

$$F = v_1 (\text{light}) \cdot 0.60 \cdot 0.80 \cdot 0 \cdot 0 \cdot 0 \cdot 0 + v_3 (\text{flight}) \cdot 0 \cdot 0.58 \cdot 0.58 \cdot 0.0 \cdot 0.58 \cdot 0.0$$

what is the result of cueing $F$ with a mixture of $0.2v_1 + 0.8v_2$? (You needn’t calculate the matrix!)

(b) [3 pts.] Describe the result in a sentence in terms of $v_1$, $v_2$ and $v_3$. 

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