

**Problem E2.** Suppose  $A \in \mathbb{R}^{m \times n^2}$  with  $m > n^2$ . Develop an alternating least squares solution framework for minimizing  $\|A(x \otimes y) - b\|_2$  where  $b \in \mathbb{R}^m$  and  $x, y \in \mathbb{R}^n$ .

**Problem A2.** Same notation as E2. What is the gradient of

$$\phi(x, y) = \frac{1}{2} \|A(x \otimes y) - b\|_2^2$$