

**2023-04-14**

The (good) Broyden update formula is

$$J_{k+1} = J_k + \frac{f(x^k)(s^k)^T}{\|s^k\|^2}, \quad s^k = x^{k+1} - x^k.$$

Argue that  $J^{k+1}$  is the minimal change from  $J^k$  in Frobenius norm that satisfies the secant condition

$$J_{k+1}(x^{k+1} - x^k) = f(x^{k+1}) - f(x^k).$$