$$\text{prox}_t(x) = \underset{z}{\text{argmin}} \; \frac{1}{2t}\|x-z\|_2^2 + h(z)$$

when $h = 0$?

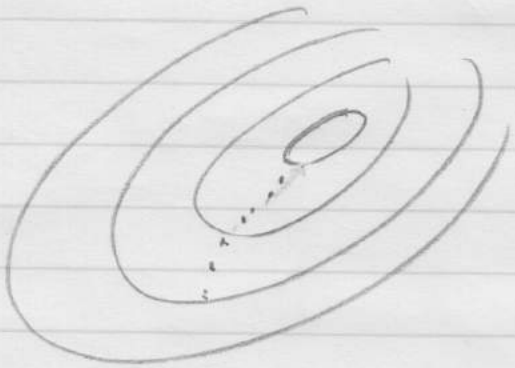
$\text{prox}_t(x) = x$ (Identity)

$x^+ = \text{prox}_t(x - t\nabla g(x))$

$= x - t\nabla g(x)$ grad descent on g.

---

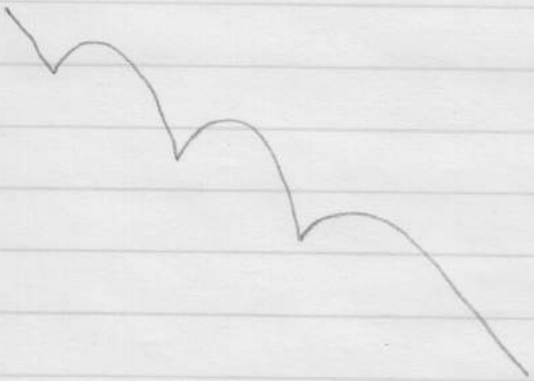
polyhedron $\{x : Ax \le b\}$



$$v = x^{(k-1)} + \frac{k-2}{k+1}(x^{(k-1)} - x^{(k-2)})$$

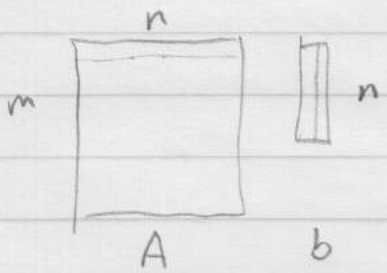
$$x^{(k)} = v - t_k \nabla g(v)$$

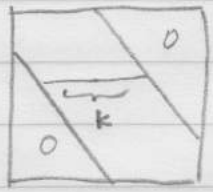
accelerated grad descent



for (int i=0; i<n; i++) a[i]=1;

$\Rightarrow$ 0 flops

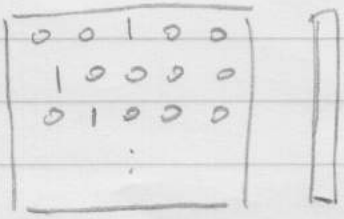




$$\sum_{i=1}^{r} u_i v_i^T b$$

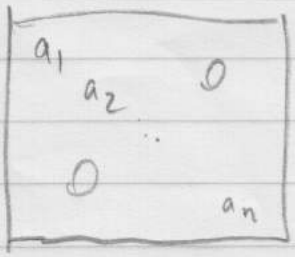
$$A = UV^T$$

$m \times r \quad r \times n$

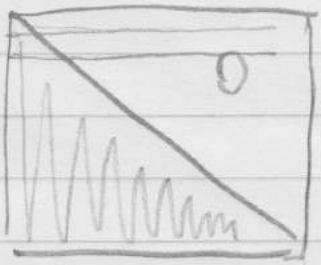


$A(Bc)$

$(AB)c$



$x = b$



$x = b$

$A_{11} x_1 = b_1$

$\Rightarrow x_1 = b_1 / A_{11}$

$A_{21} x_1 + A_{22} x_2 = b_2$

$\Rightarrow$

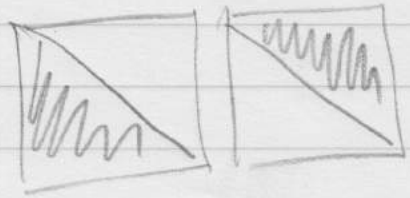
$Ax=b, \; Ax=b', \ldots$

factor A

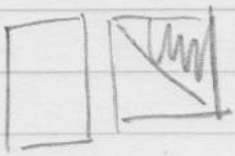
solve $Ax=b$

$Ax=b'$

$A =$



$A =$



$$A^TA = R^TQ^TQR = R^TR$$
$$= LL^T$$

$$\|x\|_2^2 = \|Q^Tx\|_2^2 + \|\tilde{Q}^Tx\|_2^2 = \|O^Tx\|_2^2$$

$[Q\ \tilde{Q}] = O$ orthogonal matrix

$m \times m$