$d_0^T V^T \Lambda V x_0$

$d_0^T V^T \Lambda^2 V x_0$

$\vdots$

$d_{n-1}^T V^T \Lambda^n V x_0$

Unknown evals, Known evecs.

$$\vec{x}_{t+1} = \begin{bmatrix} \lambda_1 & & \\ & \ddots & \\ & & \lambda_n \end{bmatrix} \vec{x}_t + \vec{u}_t .$$

$\vec{d}^T \cdot \vec{x}_t$.

$\vec{u}_t = \left(-\vec{d}^T \vec{x}_t\right) \vec{d}$

$A_t = A - \vec{d}\vec{d}^T$

does TV give us anything

Assume you knew A

But all you saw was projections along d.

PRINT your student ID: ______________________

Extra page for scratchwork.
Work on this page will NOT be graded.

$A\vec{x} = \vec{b}$

Find $\vec{x}$ s.t. $A\vec{x} = \vec{b}$ and $\|\vec{x}\|_2^2$ is minimized.

$[d_0^T \dots d_n^T] \begin{bmatrix} A \\ A^2 \\ \vdots \\ A^n \end{bmatrix} x_0$ $(n^2 \times n)$ $(n \times 1)$

$\vec{d}^T \vec{x} =$

$[d_0^T \; d_1^T \dots d_n^T]$

$\begin{bmatrix} A & A^2 & \dots & A^n \end{bmatrix} \begin{bmatrix} x_0 \\ x_0 \\ \vdots \\ x_0 \end{bmatrix}$

$x_{t+1} = Ax + Bu$

$\boxed{d_0^T A x_0}$

$\boxed{d_1^T A^2 x_0}$

$\vdots$

$\boxed{d_{n-1}^T A^n x_0}$

$\vec{d}^T \vec{x}$

Usep minimum norm

$A x_0$

$A^2 x_0$

$\vdots$

$A^n x_0$

Λ

$[V^{-1}] \begin{bmatrix} \lambda_1 & \lambda_2 & \dots & 0 \\ 0 & & \dots & \lambda_n \end{bmatrix} [V] = A$

$\vec{d}^T \boxed{A^k x_0}$ vector.

A B