# Lecture 19

- PageRank to [illegible]
- Floating point Error.

  $x+y = x+y+\delta x+\delta y.$
- general Error analysis the same for any decomp?
- LU stability, why this analysis?

$$(I - \alpha P)\underline{x} = (1-\alpha)\underline{v}$$

$$x - \alpha P \underline{x} = (1-\alpha) v$$

$$\underline{x} = \alpha P \underline{x} + (1-\alpha)\underline{v}$$

$$\underline{x}^{(k+1)} = \alpha P \underline{x}^{(k)} + (1-\alpha)\underline{v}$$

# Floating pt. and BW Error

## IEEE arithm

$$x \oplus y = (x+y)(1+\varepsilon)$$

$$|\varepsilon| \le u.$$

@ Alg ⊙

Property of the system

guarantee

## BW Error

Analysis of an Algorithm.

Alg(x) is BW stable if (for f(x))

$$\text{Alg}(\underline{x}) = \boxed{f(\underline{x}+\underline{\delta})}$$

Where $\delta$ is "small"

$$\frac{\|\delta\|}{\max(\|x\|, 1)} \le C u$$

## IEEE Arithm is BW Stable

$$f(x,y) = x+y$$

$$x \oplus y = (x+y)(1+\varepsilon)$$

$$= x(1+\varepsilon) + y(1+\varepsilon)$$

$$= x+y + \varepsilon x + \varepsilon y$$

$$= (x+\varepsilon x) + (y+\varepsilon y)$$

BW Error analysis
is specific to an
ALG and function f.