## Undersampling vs Oversampling

= Analog Radial Frequency (Rad/Sec)

= Analog Cyclic Frequency (Cycles/Sec = Hz)

= Sample spacing (sampling period)

= Sampling rate =

If

- Signal is oversampled! (Otherwise undersampled)

- Oversampled = good

Normalized Radial Frequency:

(Rad)

- q, n integers

- p, n integers

-

- Normalized radial frequency

## Principal Zone

For reconstruction (D to A) analog from sampled data

Using “Occam’s Razor” approach

= Reconstructed analog frequency =

Oversampled signals are easiest to reconstruct to original analog frequency

- Undersampling generally causes a change in analog frequency (

- And possibly changes offset angle sign

For oversampled signals

- fits

-

-

-

From Lecture 5:

Oversampled!

Principal Zone Description:

## Spectra of Sampled Sinusoids

## Special Functions to Represent Signals

Describing signals as analytic expressions (closed form)

- (Kronecker) Impulse Function System

1 for

0 for

for

for

For all values

Else

- Unit Step Function

1 for

0 for

For all values

Else