Lecture 7 Quiz

ⓘ This is a preview of the draft version of the quiz

Started: Apr 26 at 9:24am

Quiz Instructions

Please select the best answer for each question

Question 1

1 pts

Ideally in MRI the dominant source of noise is

- coil noise
- Rayleigh noise
- sample noise
- quantization noise

Question 2

1 pts

Complex gaussian noise with σ=2 in k-space will Fourier transform (with normalization) to

- Rayleigh noise with σ=2 sqrt(π/2)
- Complex Gaussian noise with σ=2
- Rician noise with σ=2
- Rayleigh noise with σ=2

Question 3

1 pts

At an SNR of about 4, the statistics in a magnitude image

- ◯ are Rayleigh with ratio of mean to standard deviation of 4sqrt(2/π)
- ◯ are Rician, but with a very small deviation from Gaussian with ratio of mean to standard deviation of 4
- ◯ are Gaussian with ratio of mean to standard deviation of 2
- ◯ are Gaussian with ratio of mean to standard deviation of 4

Question 4

1 pts

If we increase the density of phase-encodes to increase the phase-encode FOV by 3x

- ◯ SNR increases by a factor of 3 and SNR efficiency is unchanged
- ◯ SNR increases by a factor of 3 and SNR efficiency increases by a factor of sqrt(3)
- ◯ SNR increases by a factor of sqrt(3) and SNR efficiency increases by a factor of sqrt(3)
- ◯ SNR increases by a factor of sqrt(3) and SNR efficiency is unchanged

Question 5

1 pts

If we sample exactly one k-space sample twice, then average it, then

- ◯ SNR efficiency does not change

- SNR efficiency goes down slightly
- SNR efficiency goes up slightly
- SNR efficiency is not relevant to this case

Question 6

1 pts

RMS coil combination without knowledge of coil sensitivities

- Has signal bias at low signals, but no signal variation due to coil sensitivity variations
- Has signal bias at low signals, and signal variation due to coil sensitivity variations
- Has no bias, but signal variation due to coil sensitivity variations
- Has no bias or variations due to coil sensitivity variations

Question 7

1 pts

R=1 SENSE coil combination has the advantage over simple RMS coil combination (without sensitivity correction) that

- SNR is improved in all cases
- Noise contribution from insensitive coils are reduced
- Signal shading is reduced, but all coils still contribute significant noise
- Signal shading is reduced and noise contributions from insensitive coils are reduced

Question 8

1 pts

If one coil is 3x more sensitive than another, and noise covariance matrix is identity, relative R=1 SENSE weights are

- Equal to each other
- 3x higher for the more sensitive coil, and non-zero for the other
- Zero for the less sensitive coil, and 1 for the other
- sqrt(3) times higher for the more sensitive coil, and non-zero for the other
- 3x lower for the more sensitive coil, and non-zero for the other

Question 9

1 pts

Knowledge of the coil sensitivities and noise covariance matrix in accelerated SENSE enables

- Calculation of combination weights, image SNR and g-factor
- Calculation of combination weights only
- Calculation of combination weights, image noise and g-factor
- Calculation of both image SNR and g-factor

Question 10

1 pts

The g-factor represents

- Noise amplification due to normalization of signal where coil sensitivity is small

- Noise amplification due to all factors
- Noise amplification due to conditioning of the coil encoding used to unalias images
- Noise amplification due to small signal bias

Quiz saved at 9:25am

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