


Take Test: Test 3 (2018-19)

Test Information

Description

Instructions

Timed Test	This test has a time limit of 1 hour. This test will save and be submitted automatically when the time expires. Warnings appear when half the time, 5 minutes, 1 minute, and 30 seconds remain.
Multiple Attempts	This Test allows 3 attempts. This is attempt number 1.
Force Completion	This Test can be saved and resumed at any point until time has expired. The timer will continue to run if you leave the test. This test does not allow backtracking. Changes to the answer after submission are prohibited.

 Moving to the next question prevents changes to this answer.

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Question 8

9 points

Save Answer

Consider a beamformer which employs a uniform array of N antennas with half-wavelength interantenna spacing. This beamformer operates in the presence of a desired signal with direction $(\theta = 30^\circ, \phi = 0^\circ)$ and two unknown co-channel interferences. The covariance matrix of the received signal $\underline{x}(t)$ has the covariance matrix of the received signal $\underline{x}(t)$ is

7.8000 - 0.0000i, -0.7327 + 2.1623i, 5.5846 - 3.7594i,
2.9266 + 4.3835i, 1.3609 - 3.8965i;
-0.7327 - 2.1623i, 7.8000 + 0.0000i, -0.7327 + 2.1623i,
5.5846 - 3.7594i, 2.9266 + 4.3835i;
5.5846 + 3.7594i, -0.7327 - 2.1623i, 7.8000 + 0.0000i,
-0.7327 + 2.1623i, 5.5846 - 3.7594i;
2.9266 - 4.3835i, 5.5846 + 3.7594i, -0.7327 - 2.1623i,
7.8000 - 0.0000i, -0.7327 + 2.1623i;
1.3609 + 3.8965i, 2.9266 - 4.3835i, 5.5846 + 3.7594i,
-0.7327 - 2.1623i, 7.8000 + 0.0000i;

(please copy the above matrix to MATLAB)


The Wiener-Hopf weight vector, normalised to have unity norm magnitude, is

- (a) $[0.4326-0.3057i, -0.3849-0.2593i, -0.0903+0.0000i, -0.3849-0.2593i, 0.4326-0.3057i]^T$
 (b) $[0.4326+0.3057i, 0.3849+0.2593i, -0.0903+0.0000i, 0.3849-0.2593i, 0.4326-0.3057i]^T$
 (c) $[0.4326+0.3057i, -0.3849-0.2593i, -0.0903+0.0000i, -0.3849+0.2593i, 0.4326-0.3057i]^T$
 (d) $[0.4326-0.3057i, 0.3849+0.2593i, -0.0903+0.0000i, 0.3849-0.2593i, 0.4326-0.3057i]^T$

(d) $[0.4326+0.30571i, -0.3849+0.25931i, -0.0903+0.00001i, -0.3849-0.25931i, 0.4326-0.30571i]^T$

(e) None of the above

- ☐ a
- ☐ b
- ☐ c
- ☐ d
- ☐ e

 Moving to the next question prevents changes to this answer.

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