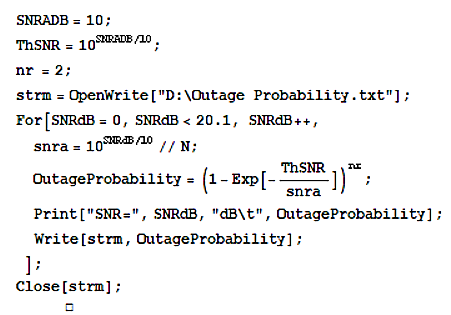
**3. Program for the outage probability of Rayleigh fading SIMO channel**

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**4. Numerical results of the outage probability of Rayleigh fading SIMO channel for = 2**

**(a) Numerical data**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SNR** | **Outage Probability at SNRADB=10** | **Outage Probability at SNRADB=5** | **Outage Probability at SNRADB=3** |  | **SNR** | **Outage Probability at SNRADB=10** | **Outage Probability at SNRADB=5** | **Outage Probability at SNRADB=3** |
| 0 | 0.999909202 | 0.917133324 | 0.74653405 |  | 11 | 0.300430389 | 0.049339242 | 0.021482155 |
| 1 | 0.999290048 | 0.844349502 | 0.632073203 |  | 12 | 0.218947095 | 0.032718032 | 0.013992621 |
| 2 | 0.99636569 | 0.74653405 | 0.512714711 |  | 13 | 0.155384973 | 0.021482155 | 0.009055917 |
| 3 | 0.986727485 | 0.632073203 | 0.399576401 |  | 14 | 0.107853096 | 0.013992621 | 0.00583084 |
| 4 | 0.963017156 | 0.512714711 | 0.300430389 |  | 15 | 0.073498781 | 0.009055917 | 0.003738884 |
| 5 | 0.917133324 | 0.399576401 | 0.218947095 |  | 16 | 0.049339242 | 0.00583084 | 0.002389597 |
| 6 | 0.844349502 | 0.300430389 | 0.155384973 |  | 17 | 0.032718032 | 0.003738884 | 0.001523238 |
| 7 | 0.74653405 | 0.218947095 | 0.107853096 |  | 18 | 0.021482155 | 0.002389597 | 0.000968953 |
| 8 | 0.632073203 | 0.155384973 | 0.073498781 |  | 19 | 0.013992621 | 0.001523238 | 0.000615338 |
| 9 | 0.512714711 | 0.107853096 | 0.049339242 |  | 20 | 0.009055917 | 0.000968953 | 0.000390256 |
| 10 | 0.399576401 | 0.073498781 | 0.032718032 |  |  |  |  |  |

**(b) Graphical representation**

**Figure 2.1.** Outage probability vs Signal to Noise Ratio plot for Rayleigh fading SIMO channel.

**(c) Description of Figure 2.1:** This is a plot of the outage probability vs Signal to Noise Ratio for various values of the average SNR (SNRADB) for ***two*** Antennas at the Receiver. This graph depicts the impact of SNR on outage probability. The graph above demonstrates that as the SNR value increases, the outage probability falls. The rate at which the outage probability falls, is determined by the threshold SNR value.

**5. Numerical results of the outage probability of Rayleigh fading SIMO channel for = 4**

**(a) Numerical data**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SNR** | **Outage Probability at SNRADB=10** | **Outage Probability at SNRADB=5** | **Outage Probability at SNRADB=3** |  | **SNR** | **Outage Probability at SNRADB=10** | **Outage Probability at SNRADB=5** | **Outage Probability at SNRADB=3** |
| 0 | 0.999818413 | 0.841133533 | 0.557313088 |  | 11 | 0.090258419 | 0.002434361 | 0.000461483 |
| 1 | 0.998580599 | 0.712926082 | 0.399516534 |  | 12 | 0.04793783 | 0.00107047 | 0.000195793 |
| 2 | 0.992744589 | 0.557313088 | 0.262876375 |  | 13 | 0.02414449 | 0.000461483 | 8.20E-05 |
| 3 | 0.97363113 | 0.399516534 | 0.1596613 |  | 14 | 0.01163229 | 0.000195793 | 3.40E-05 |
| 4 | 0.927402044 | 0.262876375 | 0.090258419 |  | 15 | 0.005402071 | 8.20096E-05 | 1.40E-05 |
| 5 | 0.841133533 | 0.1596613 | 0.04793783 |  | 16 | 0.002434361 | 3.39987E-05 | 5.71E-06 |
| 6 | 0.712926082 | 0.090258419 | 0.02414449 |  | 17 | 0.00107047 | 1.39793E-05 | 2.32E-06 |
| 7 | 0.557313088 | 0.04793783 | 0.01163229 |  | 18 | 0.000461483 | 5.7E-6 | 9.39E-07 |
| 8 | 0.399516534 | 0.02414449 | 0.005402071 |  | 19 | 0.000195793 | 2.32E-6 | 3.79E-07 |
| 9 | 0.262876375 | 0.01163229 | 0.002434361 |  | 20 | 8.20096E-05 | 9.38E-7 | 1.52E-07 |
| 10 | 0.1596613 | 0.005402071 | 0.00107047 |  |  |  |  |  |

**(b) Graphical representation**

**Figure 2.2.** Outage probability vs Signal to Noise Ratio plot for Rayleigh fading SIMO channel.

**(c) Description of Figure 2.2:** This is a plot of the outage probability vs Signal to Noise Ratio for various values of the average SNR (SNRADB) for ***four*** Antennas at the Receiver. This graph depicts the impact of SNR on outage probability. The graph above demonstrates that as the SNR value increases, the outage probability performance gets effected. Thus, system becomes more robust against fading, resulting in improved reliability.