

```
(* Define the MIMO channel capacity expression *)
```

```
C_lsnr_expr[NT_, NR_, SNR_, λ_, q_] :=  
  NT * (Log2[1 + SNR/NR λ] - Log2[E] (2 q (NT - NR)/(NR λ)))
```

```
(* Define the PDF of the fading coefficient magnitude for Hoyt distribution *)
```

```
f_hoyt[h_, q_, λ_] := (2 q q^q)/(Gamma[q] λ^q) Abs[h]^(2 q - 1) Exp[-q Abs[h]^2/λ]
```

```
(* Define the channel matrix H and the Hermitian covariance matrix R *)
```

```
H = Array[h, {NT, NR}]  
R = Expectation[ConjugateTranspose[H].H,  
  Distributed[Flatten[H], ComplexNormalDistribution[0, 1]]]
```

```
(* Define the eigenvalues of the Hermitian covariance matrix *)
```

```
eigenvalues_R = Eigenvalues[R]
```

```
(* Define the ergodic capacity expression *)
```

```
C_ergodic_expr[SNR_, NR_, eigenvalues_R_] :=  
  Expectation[Max[Log2[1 + SNR λ_i/NR], 0],  
  λ_i \[Distributed] MultinormalDistribution[eigenvalues_R, IdentityMatrix[NR]]]
```

```
(* Perform numerical evaluation using Monte Carlo simulation *)
```

```
num_trials = 10^5;  
simulated_capacity =  
  Table[C_ergodic_expr[SNR, NR, RandomVariate[NormalDistribution[0, 1], NR]] // N,  
    {num_trials}];
```

```
(* Plot the results *)
```

```
ListLinePlot[Transpose[{SNR_values, simulated_capacity}], Mesh -> All,  
  Frame -> True, FrameLabel -> {"SNR", "Ergodic Capacity"},  
  PlotLabel -> "Ergodic Capacity of MIMO System under Hoyt Fading",  
  PlotRange -> All]
```