1. Minimum variance Estimator

1.1 the probability of

1.1.1 Pdf of . Since are independent, the joint PDF of the sum of two RV’s is a convolution of two PDF’s

1 ) ,

2) ,

3) ,

f(z)

1/2

z

1.1.2 The mean of

* 1. After measurement
     1. Joint PDF: since , and are independent,

There are two variables in , it’s range should be defined . Since

is non- zero in

Hence is non zero in

🡪 , is non zero but 1

And is non-zero in , the multiple is calculated as

x

1. , and
2. and
3. and
   * 1. Conditional expectation

Hence

1. ,
2. and
   1. Iterative expectation
3. In conclusion, . QED
4. Independent and disjoint

2.1 Independent:

By definition: , And we know ,

Now the total number of two event intersections is

Hence are independent events

* 1. Disjoint events

By definition the events is disjoint if , Hence the disjoint events are

1. :