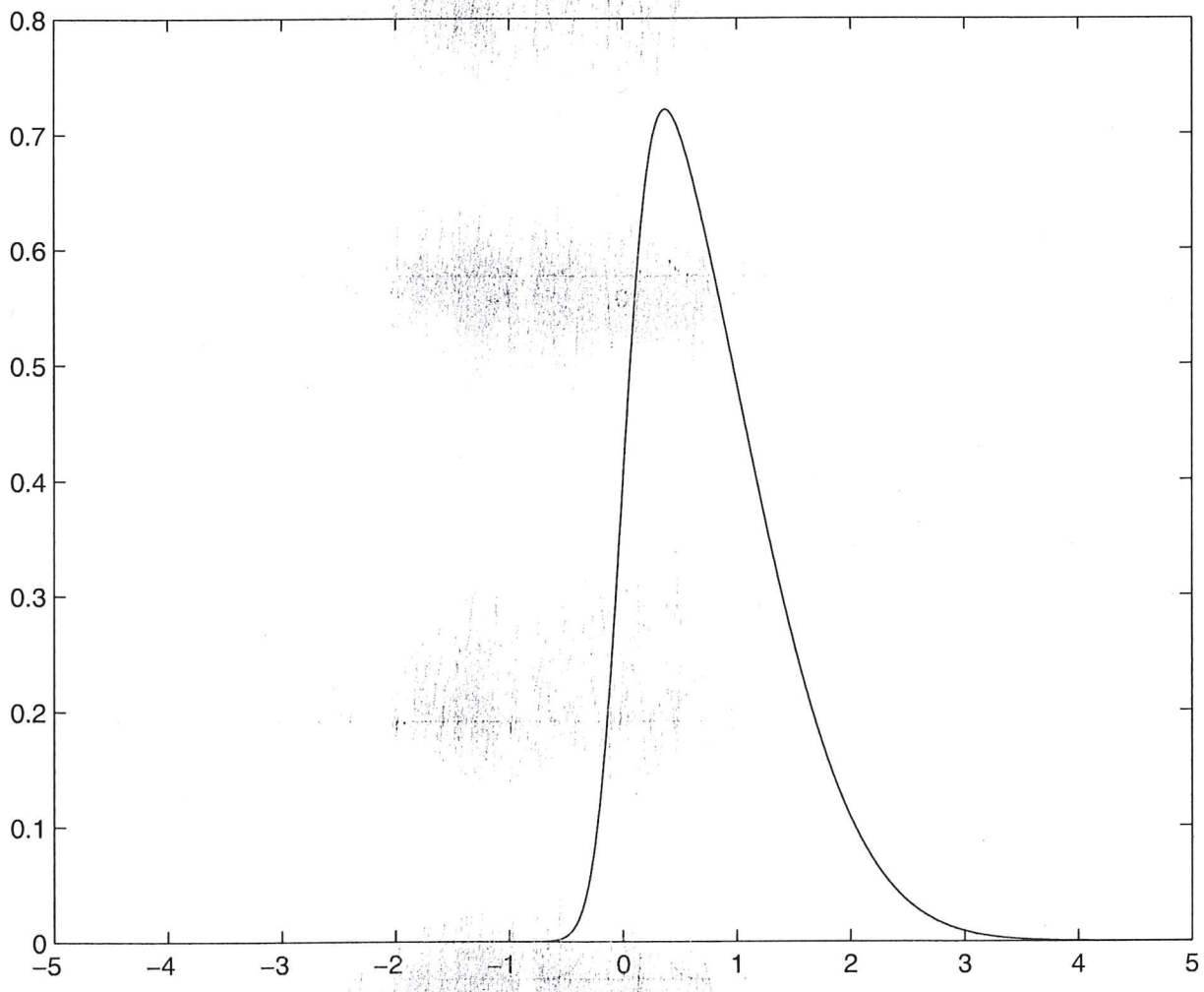
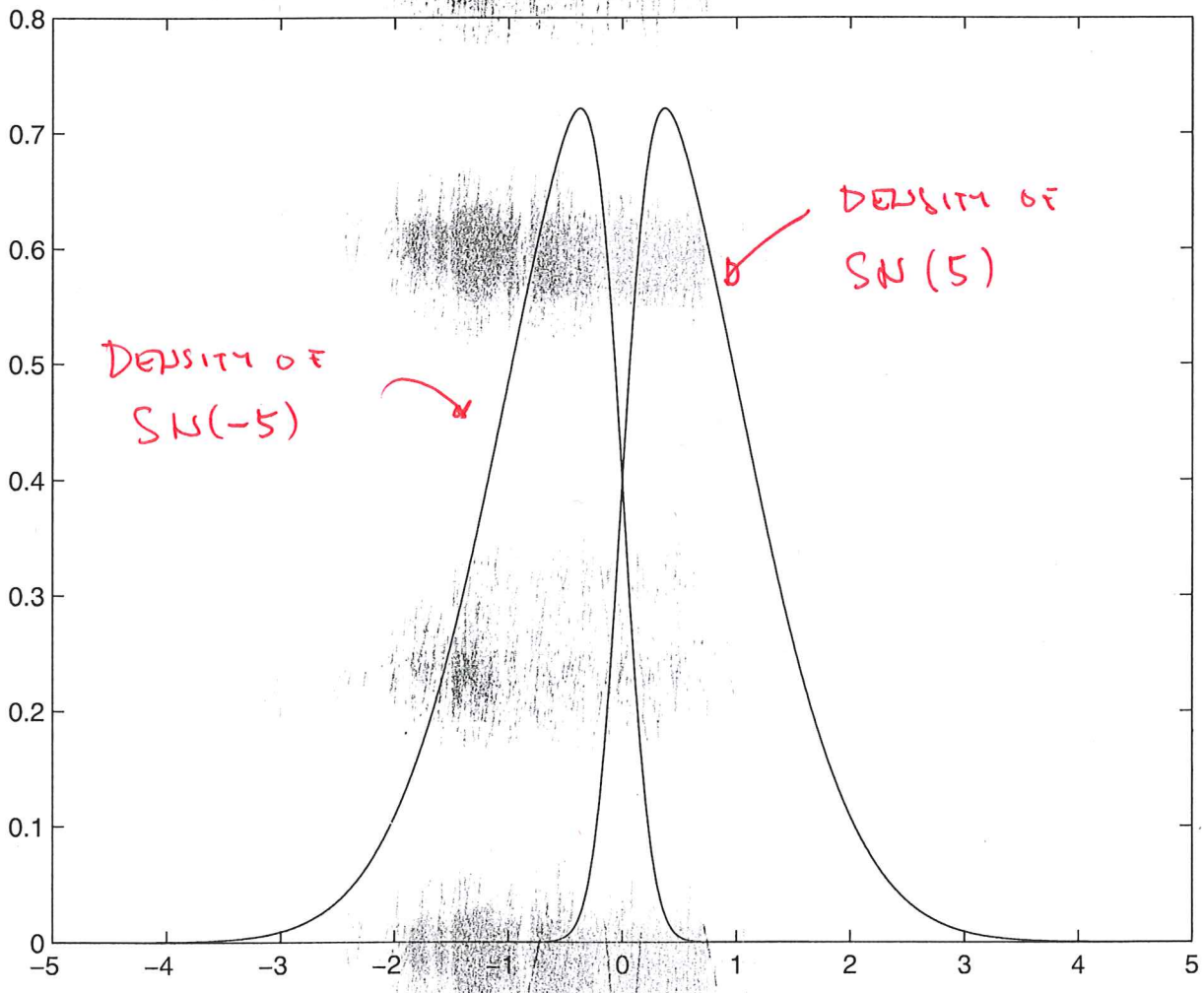
$f(x) = 2\varphi(x)\Phi(5x)$ SN(5)




0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
−5
−4
−3
−2
−1
0
1
2
3
4
5
DENSITY OF
SN(5)
DENSITY OF
SN(−5)

```
>> type skewnmean
```

BOOTSTRAPS $\hat{\lambda}$, THE ESTIMATE OF λ, $SN(\lambda)$ AND COMPUTES STANDARD ERROR USING X

```
function  [bsstderr,p,lhats]=skewnmean(x,n)
lhats=[];p=0;
for i=1:n
bssampl=stovelstropp(x);
arm=mean(bssampl);
if abs(arm) <= sqrt(2/pi), lhat= sqrt((arm^(2))/((2/pi) - arm^(2)));
lhats=[lhats lhat] ;
else  p=p+1;
end
end
bsstderr= std(lhats);
```

BOOTSTRAPS OF X

abs(mean)

STANDARD ERROR

```
>> type skewnest
```

ESTIMATE OF λ IN $SN(\lambda)$

```
function   [lhat, def] =skewnest(x)
def=0;
if  mean(x) <= sqrt(2/pi), lhat= sqrt((mean(x)^(2))/((2/pi) - mean(x)^(2)));
else   def=def+1;
end
```

```
>> type skewnormal
```

SIMULATED $SN(\lambda)$

```
function   z=skewnormal(la,n)
z=[];
x=randn(n,1,1);y=randn(n,1,1);
for i=1:n
    if  la*y(i)>=x(i);
         u=y(i);
    else
        u=-y(i);
   end,
    z=[z u ];
end
```

```
>> z=skewnormal(0.6,100);
```

$\lambda = 0.6$, 100 SAMPLES

```
>> [bsstderr,p,lhats]= skewnmean(z,1000);
```

BOOTSTRAP

```
>> bsstderr

bsstderr =

    0.1601
```

STANDARD ERROR ($\hat{\lambda}$)

```
>> boot=bootstrp(1000,'skewnest',z);
```

MATLAB FUNCTION, THE FUNCTION HANDLE TAKES THE .mfile WRITTEN BY T.K.

```
>> std(boot)

ans =

    0.1652
```

ST. STANDARD ERROR ($\hat{\lambda}$)

```
>> hist(boot,100)
>> hist(lhats,100)
>> std(z)

ans =

    0.9309

>> mean(z)

ans =

    0.3278

>> gprim=(1/2*pi)/( (2/pi) - mean(z)^(2))^(3/2)

gprim =

    4.0807

>> gprim*std(z)/sqrt(100)

ans =

    0.3799

>> lhat=skewnest(z)

lhat =

    0.4506

>>
>> parboot=skewnormal(lhat,1000);
>> parbootest=skewnest(parboot);
>> hist(parbootest,100)
>> hist(parboot,100)
>> parbootest=skewnest(parboot);
>> size(parbootest)

ans =

     1     1

>> parbootest=skewnest(parboot);
>> size(parbootest)
```

GAUSS' APPROXIMATION OF $STD(\hat{\lambda})$

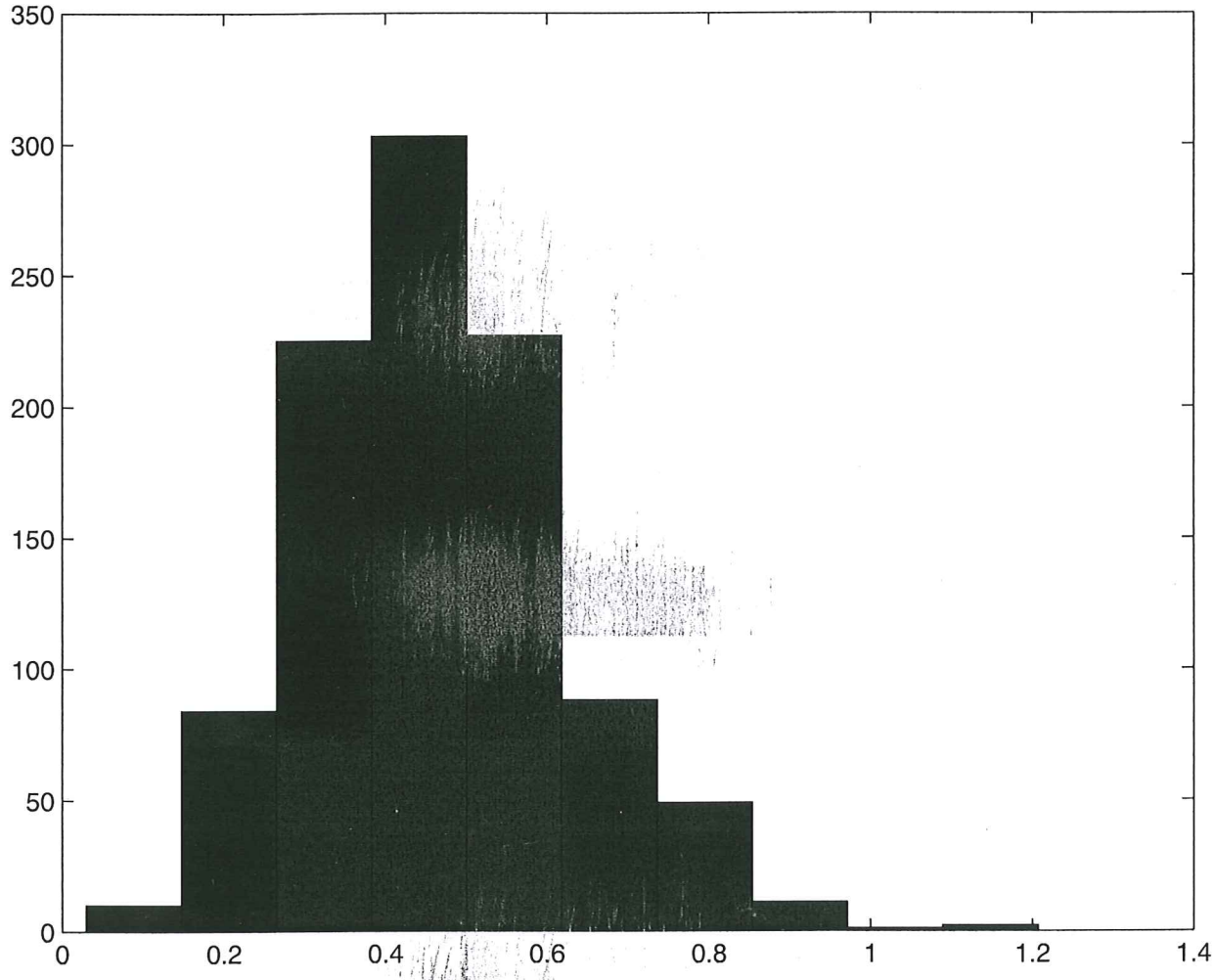
```
ans =

     1     1

>> parbootest

parbootest =

    0.4956

>> lhat

lhat =

    0.4506

>> pboots=parbootskn(lhat,100,1000);
>> hist(pboots,100)
>> std(pboots)

ans =

    0.1730

>> type  parbootskn

function  pboots=parbootskn(la,m,n)
pboots=[];
for i=1:n
z=skewnormal(la,m);
pboot=skewnest(z);
pboots=[pboots  pboot];
end
>>
```

PARAMETRIC BOOTSTRAP

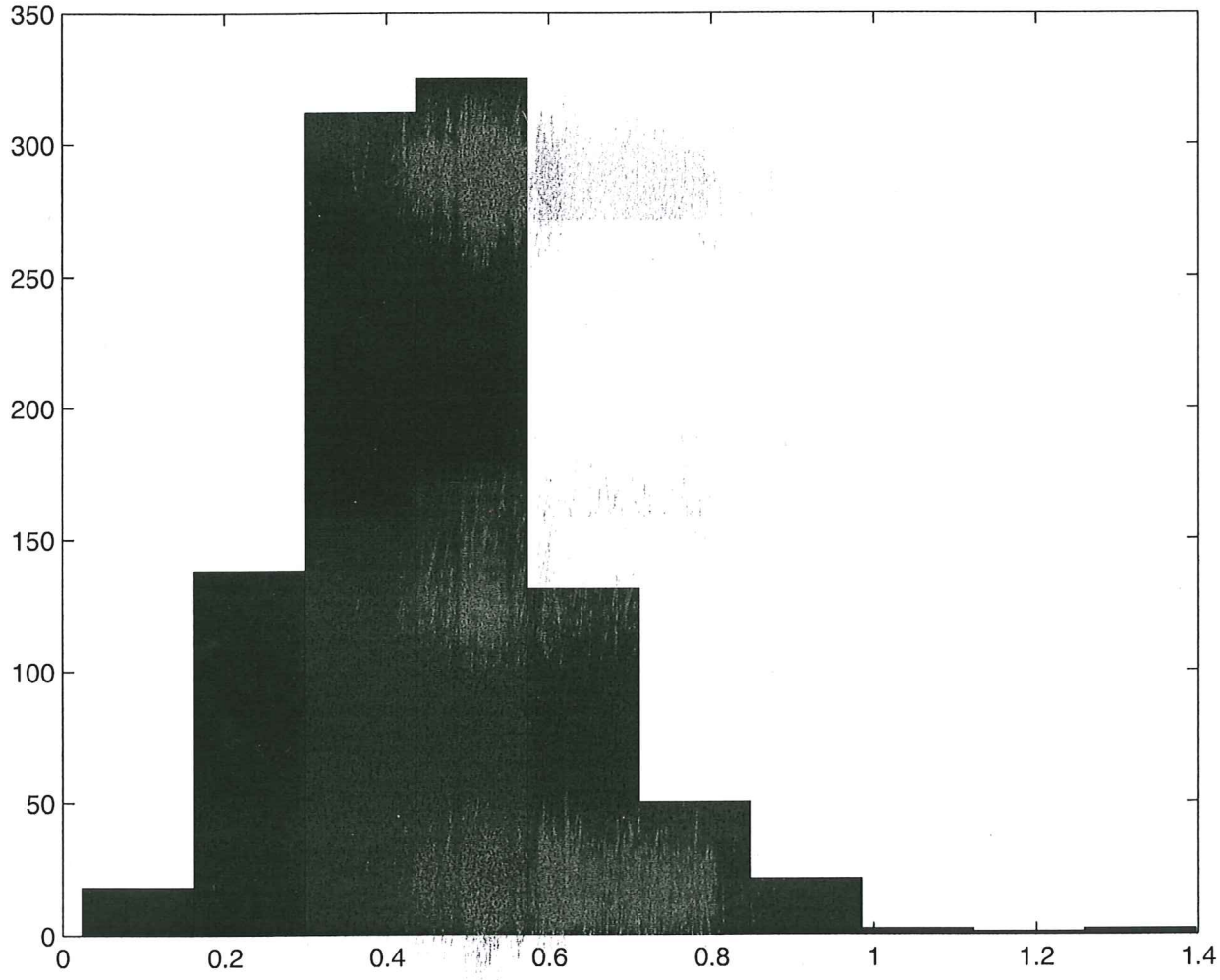
STANDARD ERROR $\hat{\lambda}$.

PARAMETRIC BOOTSTRAP OF $\hat{\lambda}$, $SN(\lambda)$, WITH $la = \hat{\lambda}'$

HIST(lhats, 10)



HIST(boot,10)



hist(pboots, 40)