Lösungen / Statistik 2/13

```
Remove["Global`*"]
```

1.

a

```
alpha = 0.01;
f[z_, n_] := Gamma[(n + 1) / 2] / (Sqrt[n Pi] Gamma[n / 2]) / (1 + z^2 / n)^((n + 1) / 2);
{"c", c = c /. FindRoot[alpha / 2 == Evaluate[1 - Integrate[f[u, 20], {u, -Infinity, c}]],
     {c, 2}] // Chop, "Interv", {-c, +c}}
```

```
FindRoot::lstol :
 The line search decreased the step size to within tolerance specified by AccuracyGoal and
   PrecisionGoal but was unable to find a sufficient decrease in the merit function.  You may
   need more than MachinePrecision digits of working precision to meet these tolerances. Mehr…
```

```
{c, 2.84534, Interv, {-2.84534, 2.84534}}
```

```
Ii[s_, n_, μ0_] := {-c * s / Sqrt[n] + μ0, c * s / Sqrt[n] + μ0}
```

```
Ii[1.2, 20, 128]
```

```
{127.237, 128.763}
```

```
{-2.84534 * 1.2 / Sqrt[20] + 128, 2.84534 * 1.2 / Sqrt[20] + 128}
```

```
{127.237, 128.763}
```

127.3 in iI, H0 o.k.

b

```
alpha = 0.001;
f[z_, n_] := Gamma[(n + 1) / 2] / (Sqrt[n Pi] Gamma[n / 2]) / (1 + z^2 / n)^((n + 1) / 2);
{"c", c = c /. FindRoot[alpha / 2 == Evaluate[1 - Integrate[f[u, 100], {u, -Infinity, c}]],
     {c, 2}] // Chop, "Interv", {-c, +c}}
```

```
{c, 3.39049, Interv, {-3.39049, 3.39049}}
```

```
Ii[s_, n_, μ0_] := {-c * s / Sqrt[n] + μ0, c * s / Sqrt[n] + μ0}
```

```
Ii[2, 100, 400]
```

```
{399.322, 400.678}
```

406.78 not in iI, H1 o.k.

2.

```
alpha = 0.001;
f[z_, n_] := Gamma[(n + 1) / 2] / (Sqrt[n Pi] Gamma[n / 2]) / (1 + z^2 / n)^((n + 1) / 2);
{"c",
 c = c /. FindRoot[alpha == Evaluate[Integrate[f[u, 100], {u, -Infinity, c}]], {c, -2}] //
   Chop, "Interv", {-c, Infinity}}
```

```
{c, -3.17374, Interv, {3.17374, ∞}}
```

```
Ii[s_, n_, μ0_] := {c * s / Sqrt[n] + μ0, Infinity * s / Sqrt[n] + μ0}
```

```
Ii[2, 100, 400]
```

```
{399.365, ∞}
```

406.78 in iI, H1 o.k.