Companion software for "Volker Ziemann, *Physics and Finance, Springer, 2021*" (https://link.springer.com/book/10.1007/978-3-030-63643-2)

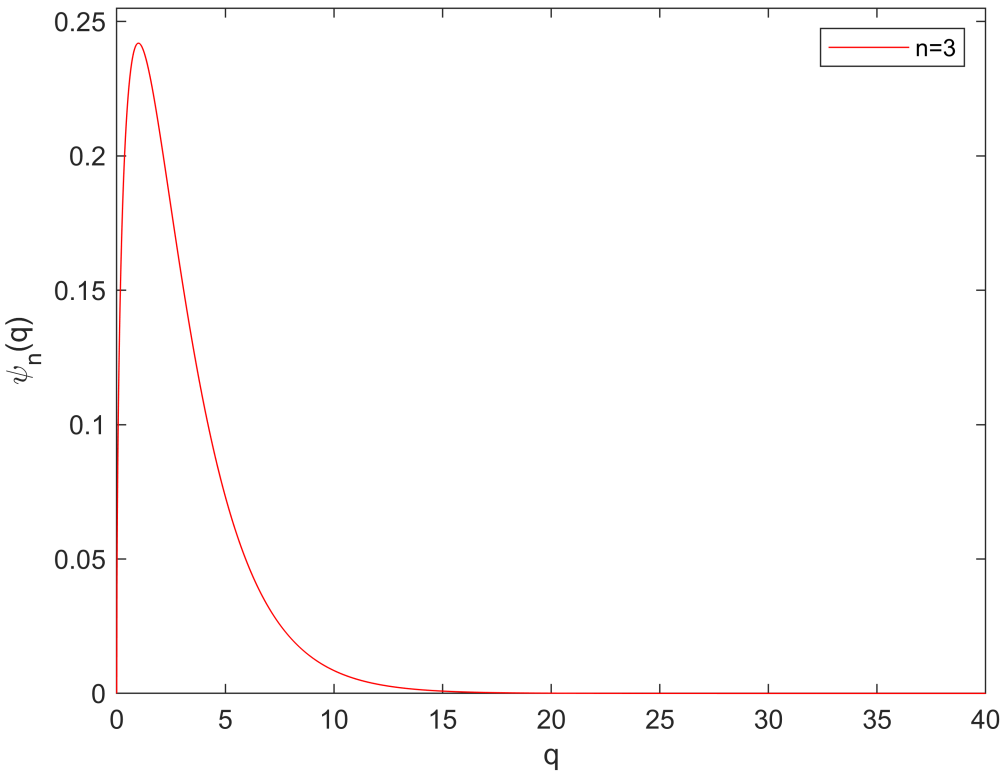
χ^2-distribution (Section 7.4)

Volker Ziemann, 211125, CC-BY-SA-4.0

In this example we simply plot the χ^2-distribution function $\psi_n(q)$, defined in Equation 7.22, which shows the distribution of the squares n independet random variables, each with a Gaussian (normal) distribution.

First we use a slider to set the value n and define the range of values q to plot, before actually plotting the function chisqfun(), which is defined in the appendix. Finally we annotate the axes.

```
clear
n=3; % Slider to select n
q=0:0.01:40;
plot(q,chisqfun(q,n),'r')
ylim([0,0.255])
xlabel('q')
ylabel('\psi_n(q)')
legend(['n=',num2str(n)])
```



Appendix

The function chisqfun() encodes $\psi_n(q)$ defined in Equation 7.22.

```
function out=chisqfun(q,n)
fact=2^(n/2)*gamma(n/2);
out=q.^(n/2-1).*exp(-q/2)/fact;
end
```