Using output from other sources

This document performs no computations (i.e., it has no active code blocks) but instead uses selected parts of the output created by other documents. Thus this document can be compiled using `pdflatex summary`. The basic structure of this document is as follows.

```
\documentclass[12pt]{article}
\usepackage{pylatex}    % so that we can use \py{foo}
\usepackage{amsmath}
...                     % other packages such as geometry, hyperref, breqn etc.
\begin{document}
   ...
   \input{example-01.pytex}  % all Python output from example-01.tex
   ...
   \begin{align*}
      &\py*{ans.301}\\       % the Python output
      &\py*{ans.302}
   \end{align*}
   ...
   \input{example-02.pytex}  % all Python output from example-02.tex
   ...
   \begin{align*}
      &\py*{ans.401}\\       % the Python output
      &\py*{ans.402}
   \end{align*}
   ...
\end{document}
```

Note that care must be taken to avoid name clashes across tags from different sources. If two or more sources define tags with the same name (e.g., `foo.pytex` and `bah.pytex` both define `\pytag{ans.101}`) then the last definition will be used.

Example 1

`ans.102` $:= -x\left(-a+x\right)\left(x+1\right)$

`ans.302` $:= \infty$

`ans.303` $:= 2x$

`ans.305` $:= e^{a}$

`ans.401` $:= \frac{1}{2}+\frac{3\left(x-1\right)^{2}}{16}-\frac{\left(x-1\right)^{3}}{8}+\frac{5\left(x-1\right)^{4}}{64}-\frac{3\left(x-1\right)^{5}}{64}-\frac{x}{4}+O\left(\left(x-1\right)^{6};x\to 1\right)$

`ans.402` $:= 1+x+\frac{x^{2}}{2}+\frac{x^{3}}{6}+\frac{x^{4}}{24}+\frac{x^{5}}{120}+O\left(x^{6}\right)$

`ans.403` $:= \frac{3121579929551692678469635660835626209661709}{19208153678594630996005115261519295601920000}$

`ans.404` $:= \frac{\pi^{4}}{90}$

Example 2

$$\frac{d}{dx}\sin(x) = \cos(x) \qquad \int \sin(x)\,dx = -\cos(x)$$
$$\frac{d}{dx}\cos(x) = -\sin(x) \qquad \int \cos(x)\,dx = \sin(x)$$
$$\frac{d}{dx}\tan(x) = \tan^2(x) + 1 \qquad \int \tan(x)\,dx = -\log(\cos(x))$$
$$\frac{d}{dx}\operatorname{asin}(x) = \frac{1}{\sqrt{-x^2+1}} \qquad \int \operatorname{asin}(x)\,dx = x\operatorname{asin}(x) + \sqrt{-x^2+1}$$
$$\frac{d}{dx}\operatorname{acos}(x) = -\frac{1}{\sqrt{-x^2+1}} \qquad \int \operatorname{acos}(x)\,dx = x\operatorname{acos}(x) - \sqrt{-x^2+1}$$
$$\frac{d}{dx}\operatorname{atan}(x) = \frac{1}{x^2+1} \qquad \int \operatorname{atan}(x)\,dx = x\operatorname{atan}(x) - \frac{\log(x^2+1)}{2}$$
$$\frac{d}{dx}\sinh(x) = \cosh(x) \qquad \int \sinh(x)\,dx = \cosh(x)$$
$$\frac{d}{dx}\cosh(x) = \sinh(x) \qquad \int \cosh(x)\,dx = \sinh(x)$$
$$\frac{d}{dx}\tanh(x) = -\tanh^2(x) + 1 \qquad \int \tanh(x)\,dx = x - \log(\tanh(x)+1)$$

Example 3

$$\begin{aligned}
\int_0^4\int_0^3\int_0^2 f(x,y,z)\,dx\,dy\,dz &= \int_0^4\int_0^3\int_0^2 \left(xy + y\sin(z) + \cos(x+y)\right)\,dx\,dy\,dz \\
&= \int_0^4\int_0^3 \left(2y\sin(z) + 2y - \sin(y) + \sin(y+2)\right)\,dy\,dz \\
&= \int_0^4 \left(9\sin(z) + \cos(3) + \cos(2) - \cos(5) + 8\right)\,dz \\
&= 4\cos(3) + 4\cos(2) - 4\cos(5) - 9\cos(4) + 41 \\
&\approx 40.1235865133293
\end{aligned}$$

Example 4

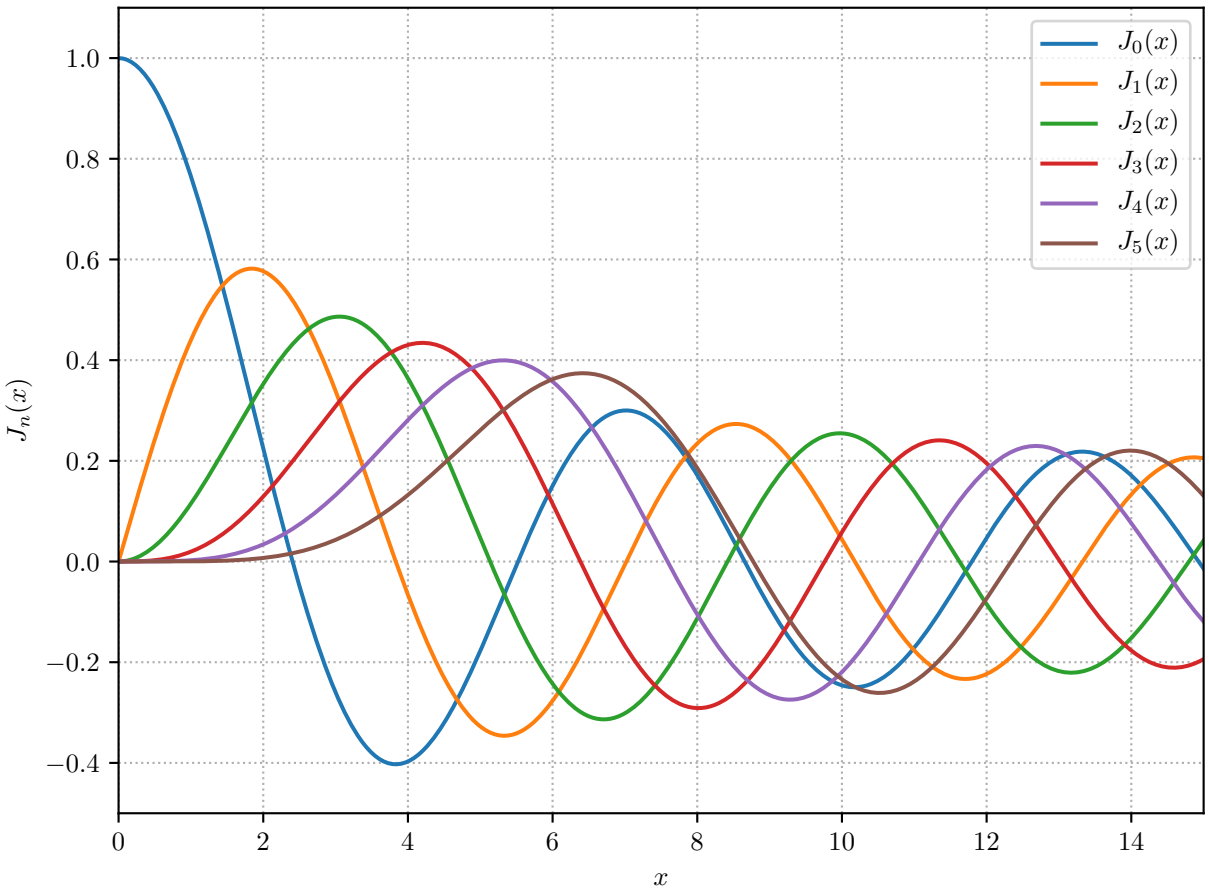

Figure 1: The first six Bessel functions.

Example 5

$$
\begin{aligned}
f(x) &= \frac{1}{x+1} && \texttt{(ans.511)}\\
&= 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + O\left(x^{10}\right) && \texttt{(ans.512)}\\
&= 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + x^{10} - x^{11} + x^{12} - x^{13} + x^{14} - x^{15} + x^{16}\\
&\quad - x^{17} + x^{18} - x^{19} + O\left(x^{20}\right) && \texttt{(ans.513)}\\
&= 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + x^{10} - x^{11} + x^{12} - x^{13} + x^{14} - x^{15} + x^{16}\\
&\quad - x^{17} + x^{18} - x^{19} + x^{20} - x^{21} + x^{22} + O\left(x^{23}\right) && \texttt{(ans.514)}\\
&= 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + x^{10} - x^{11} + x^{12} - x^{13} + x^{14} - x^{15} + x^{16}\\
&\quad - x^{17} + x^{18} - x^{19} + x^{20} - x^{21} + x^{22} + O\left(x^{23}\right) && \texttt{(ans.514)}
\end{aligned}
$$

Example 6

Newton-Raphson iterations $x_{n+1} = x_n - f_n/f'_n\ , \quad f(x) = x - e^{-x}$			
n	x_n	$\epsilon_n = x_n - e^{-x_n}$	$\epsilon_n/\epsilon_{n-1}^2$
0	0.50000000000000000000000000	-1.0653065971e-1	
1	0.56631100319721815304164922	-1.3045098060e-3	-0.11495
2	0.56714316503486221278651210	-1.9648047172e-7	-0.11546
3	0.56714329040978102869957660	-4.4574262753e-15	-0.11546
4	0.56714329040978387299996870	-2.2941072910e-30	-0.11546
5	0.56714329040978387299996870	-6.0767705445e-61	-0.11546
6	0.56714329040978387299996870	-4.2637434326e-122	-0.11546

Example 7

```
      date :    Mon 27 Aug 2018 10:37:23
    python :    2.7.15
    system :    Darwin
   release :    17.7.0
   machine :    x86_64
 processor :    i386
  platform :    Darwin-17.7.0-x86_64-i386-64bit
```