Tutorial 6: Interpolation in *Mathematica*

Mathematica has a nice command that will create an interpolation function of any set of data in an ordered pair. This interpolation function can be treaded like any normal function. First, lets generate a set of data

\[
data = \text{Table}\left[\{i 0.01 \frac{2\pi}{5}, \sin[i 0.01 \frac{2\pi}{5}]\}, \{i, 0, 999, 1\}\right];
\]

ListPlot[data, Frame -> True];

The data is a list of ordered pairs. Now lets interpolate this data as a function of time

\[
f[t_] = \text{Interpolation}[data][t]
\]

InterpolatingFunction[{{0., 12.5538}}, <>][t]

Plot[f[t], {t, 0, 2\pi}, Frame -> True];

We can treat this function like any other function, lets find its derivative.
\[ df[t_] = f'[t] \]

\[ \text{InterpolatingFunction}[\{(0., 12.5538), <>\}[t] \]

\[ \text{Plot[df[t], \{t, 0, 2\pi\}, Frame \to \text{True}];} \]