DAMOCO: MATLAB toolbox for multivariate data analysis, based on coupled oscillators approach
Example 3

January 16, 2011

1 Data and method

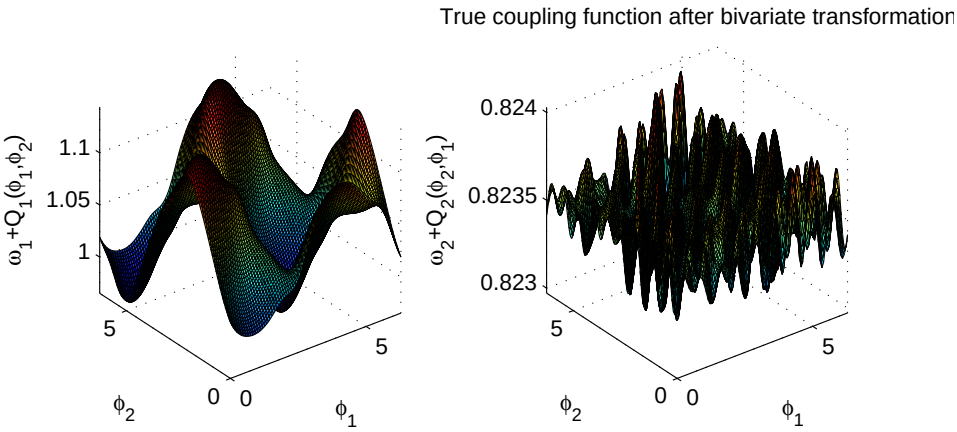
This example is implemented by the function `co_example3`; it uses the data file `co_vdp2uni.mat`. The data for this example are generated by a model of two unidirectionally coupled van der Pol oscillators:

$$\begin{aligned} \ddot{x}_1 - \mu(1-x_1^2)\dot{x}_1 + \omega_1^2 x &= \varepsilon_1(\dot{x}_2 - \dot{x}_1) \ , \\ \ddot{x}_2 - \mu(1-x_2^2)\dot{x}_2 + \omega_2^2 x &= 0 \ . \end{aligned} \tag{1}$$

Parameters are: $\mu = 0.5$, $\omega_1 = 1.11$, $\omega_2 = 0.89$, and $\varepsilon_1 = 0.1$.
In this example, we use the high-level function, which computes everything, using default parameters. Hier the iteration technique is used, see manual and related publications for details.

2 Output and comments

```
--------  Starting co_example3  -----------
iteration 1: omega1=1.0541 omega2=0.8235
iteration 2: omega1=1.0541 omega2=0.8235
iteration 3: omega1=1.0541 omega2=0.8235
iteration 4: omega1=1.0541 omega2=0.8235
Synchronization index from phases 0.11247
Directionality index 0.99149
--------  End of co_example3  --------
```



Note differente scales in the plots of coupling function. In fact, the 2nd coupling function is flat, as expected for the case of unidirectional