Paper: VEXPA: Validated EXPonential Analysis through regular sub-sampling.pdf

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Example Figure 2.

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Script environment

This script does not depend on the random number generator state.

```
clear
close all
```

Example Figure 2.

In Figure 2 we illustrate the relationship between the ρ_i and the relative position of the λ_i with respect to each other. For our toy problem we choose $\Omega = 100, n = 10, \alpha_i = 1, \mu_i = \mathrm{i}2\pi(i-1)$. At the left the values ρ_i are plotted at the locations of the generalized eigenvalues $\lambda_i = \exp(\mu_i/\Omega), i = 1, \ldots, n$. When changing the undersampling parameter u in ${}_u^s H_n$ in (4) and (8) from $u = 1$ to $u = 10$ and recomputing the generalized eigenvalues $\exp(10\mu_i/\Omega)$ and the disposedness, which we now denote by ${}_u\rho_i$, the result, which is shown at the right, changes dramatically. Actually, taking $u > 1$ is equivalent to replacing Δ by $u\Delta$ or replacing Ω by Ω/u.

```
b = exp(2*pi*1i*(0:9)/100);
bu = exp(2*pi*1i*(0:9)/10);
c = ones(size(b));

params = MultiExponentialParameters(1/100,{b,c},'normalized');
paramsu = MultiExponentialParameters(1/100,{bu,c},'normalized');

plot3_base_terms(params,'--z','ill-disposedness');
title(['Figure 2. (left) Ill-disposed \lambda_i = exp(i2\pi'...
       '(i-1)/100), i=1,...,10.'])
```

```
plot3_base_terms(paramsu,'--z','ill-disposedness');
title(['Figure 2. (right) well-disposed _1_0\lambda_i = exp('...
       'i2\pi(i-1)/10), i=1,...10.'])
```

Figure 2. (left) Ill-disposed λ_i = exp(i2π(i-1)/100), i=1,...,10.

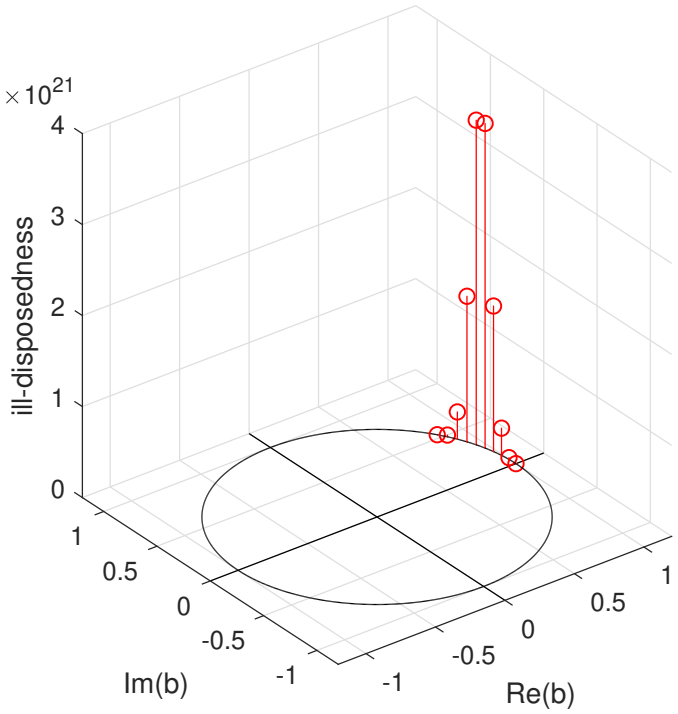

Figure 2. (right) well-disposed $_{10}\lambda_i$ = exp(i2π(i-1)/10), i=1,...10.