setup

overhead

tag

In[173]:=
```
home = "rcs/fourier/analysis/";
Get["utility modules.m", Path → dirPack];
Get["rcs-tools-01.m", Path → dirnb <> "rcs/tools/"];
stamp1;
```

```
maximum memory: 0.202191 GB
seed file: /Users/dantopa/primary-repos/github/experiment-mathematica/nb/seed 19_12.nb
user: dantopa, CPU: Xiuhcoatl,  MM v. 12.1.0 for Mac OS X x86
date: May 10, 2020, time: 18:24:41
nb: /Users/dantopa/primary-repos/github/experiment-mathematica/nb/rcs/fourier/analysis/
 fourier-svd-01.nb
```

modules, functions, settings, ...

1

In[184]:=
```
σ = Import[dirDataLocker <> sciaccarcs];
Dimensions[σ]
λ = Length[σ]
```

Out[•]=
```
{28, 361}
```

Out[•]=
```
28
```

2

linear system

In[•]:=
```
mesh = Range[-180, 180];
d = 4;
A = BuildAFourierCos[mesh, d];
```

least squares

```
In[•]:= k = 1;
        b = σ[[k]];
        frequency = k + 2;
        (* solution *)
        x = LeastSquares[A, b];
        (* error propagation *)
        error[A // N, x, b];
```

svd

```
In[•]:= {U, Σ, V} = Chop[SingularValueDecomposition[A // N]]
```

Out[•]= { … 1 … }

large output | show less | show more | show all | set size limit...

```
In[•]:= Diagonal[Σ]
        ρ = Length[%]
```

Out[•]= {19.0006, 13.5638, 13.4164, 13.4164, 13.4164}

Out[•]= 5

```
In[•]:= Dimensions[U]
```

Out[•]= {361, 361}

```
In[•]:= Un = U[[1 ;; 361, ρ + 1 ;; 361]];
        Dimensions[Un]
```

Out[•]= {361, 356}

```
In[•]:= Ur = U[[1 ;; 361, 1 ;; ρ]];
        Dimensions[%]
        br = Urᴴ.b;
        Dimensions[%]
        Norm[br, 2]
```

Out[•]= {361, 5}

Out[•]= {5}

Out[•]= 675.682

```
In[•]:= bn = Un^H.b;
        Dimensions[%]
        Norm[bn, 2]
Out[•]= {356}
Out[•]= 25.2059

In[•]:= Norm[b, 2]
Out[•]= 676.152

In[•]:= √(Norm[br, 2]^2 + Norm[bn, 2]^2)
Out[•]= 676.152

In[•]:= Norm[bn, 2] / Norm[br, 2] 7
Out[•]= 0.261131
```

---

end