

Four Forms of the Fourier Transform

— for Freshmen, using MATLAB

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I am a geologically inspired, geophysically educated, computationally motivated and mathematically minded geoscientist, passionate about reproducible research.

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Joined on Feb 27, 2014

Organizations

Pinned repositories Customize your pinned repositories

- [csdms-contrib/slepian_alpha](#)
Scalar spherical-harmonic analysis and Slepian functions
6 Stars 5 Forks
- [csdms-contrib/slepian_echo](#)
Cubed-sphere wavelets
1 Star
- [csdms-contrib/slepian_juliet](#)
Maximum-likelihood analysis of univariate isotropic Matérn random fields
1 Star
- [csdms-contrib/slepian_oscar](#)
Seismic processing bits and pieces

216 contributions in the last year Contribution settings

Contribution activity Jump to 2016

December 2016
fjsimons has no activity yet for this period.

November 2016

- Created 33 commits in 5 repositories
- [csdms-contrib/slepian_juliet](#) 10 commits
- [csdms-contrib/slepian_alpha](#) 9 commits
- [csdms-contrib/slepian_echo](#) 8 commits
- [csdms-contrib/slepian_zero](#) 5 commits
- [csdms-contrib/slepian_bravo](#) 1 commit

- Variable precision arithmetic: `vpa`
- Optimization toolbox, e.g. `fminunc`, `fmincon`
- Symbolic toolbox: `syms`

- Example: $\iint S(\mathbf{k}) d\mathbf{k}$ when $S(k) = \frac{\sigma^2 \nu^{\nu+1} 4^\nu}{\pi (\pi \rho)^{2\nu}} \left(\frac{4\nu}{\pi^2 \rho^2} + k^2 \right)^{-\nu-1}$

```
>> syms s2 nu rh positive
```

```
>> Sk=sym(' s2*nu^(nu+1)*4^nu/p/...
```

```
      (p*rh)^(2*nu)*(4*nu/(p*rh)^2+k^2)^(-nu-1)');
```

```
>> Skk=2*p*Sk*k;
```

```
>> Sintinf=simplify(int(Skk,'k',0,Inf))
```

```
Sintinf =
```

```
s2
```

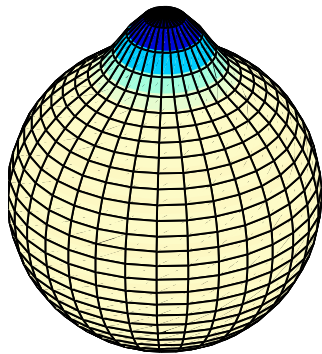
Some of my favorite MATLAB tricks

tips

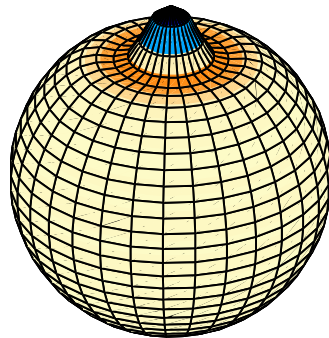
- OnRamp <https://matlabacademy.mathworks.com>
- Cody Coursework <https://coursework.mathworks.com>
- Loren Shure's blog <http://blogs.mathworks.com/loren>
- My archive <https://github.com/fjsimons>
- My channel <https://www.youtube.com/user/fritsebits>
- ...

Some of my favorite plots

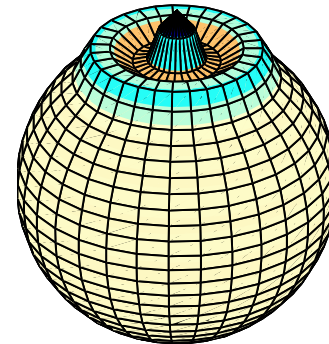
$$\lambda_1 = 1.000 \times 10^{-00}$$



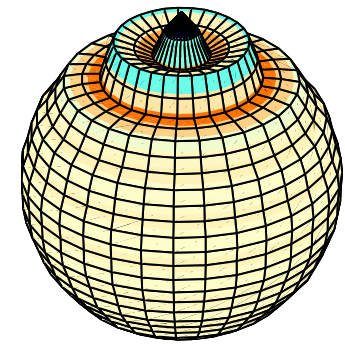
$$\lambda_2 = 1.000 \times 10^{-00}$$



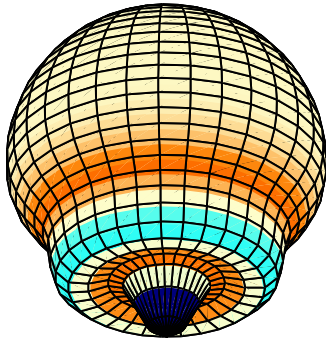
$$\lambda_3 = 9.993 \times 10^{-01}$$



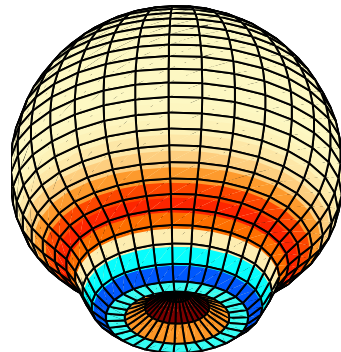
$$\lambda_4 = 9.299 \times 10^{-01}$$



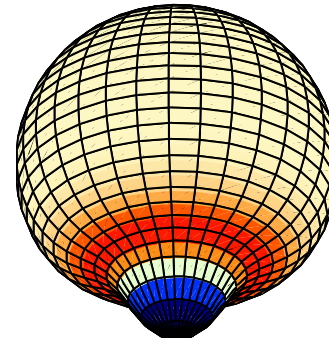
$$\lambda_{16} = 6.667 \times 10^{-17}$$



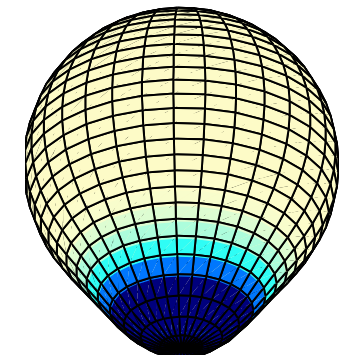
$$\lambda_{17} = 2.715 \times 10^{-17}$$



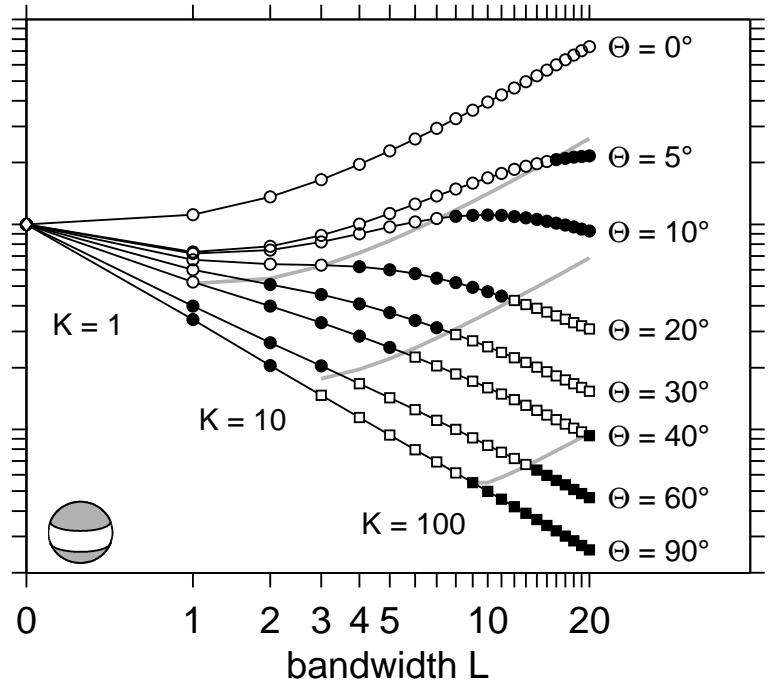
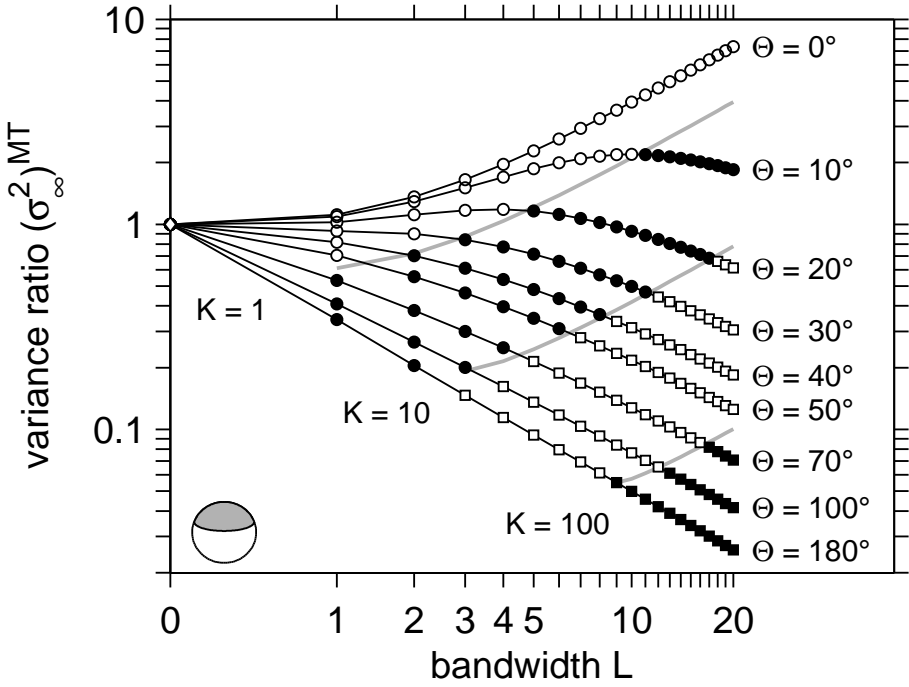
$$\lambda_{18} = 1.725 \times 10^{-16}$$

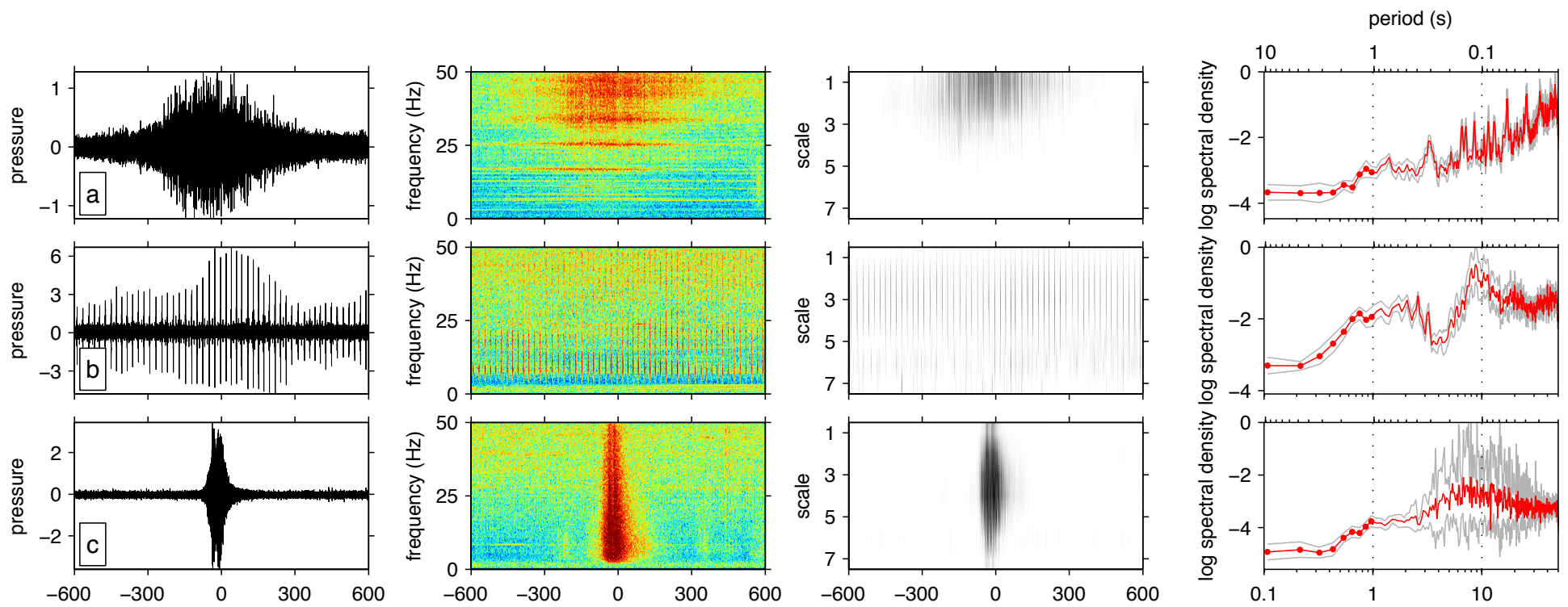


$$\lambda_{19} = 3.738 \times 10^{-17}$$



Some of my favorite plots





Some of my favorite plots

