## Data Sets

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| File Name | File Description |
| [NewData.xslx](http://www.mscs.mu.edu/~stevem/bala/NewData.xlsx) | 119 Hashimoto’s thyroiditis patients raw dataset |
| [NOPT.xlsx](http://www.mscs.mu.edu/~stevem/bala/NOPT.xlsx) | This file contains patient’s identification number (Id), time (Time), thyroid stimulating hormone (TSH), free thyroxine (FT4), and anti-thyroid antibodies (TPOAb and TGAb). There are 119 Hashimoto’s thyroiditis patients in this dataset. It is created from NewData.xslx file. |
| [group1scaled.xlsx](http://www.mscs.mu.edu/~stevem/bala/group1scaled.xlsx) | Always untreated patient’s dataset is created from NOPT.mat file. This dataset contains Id, Time, TSH, FT4, TPOAb and TGAb. Note: group1 patient’s TSH and FT4 values are all scaled to normal reference range of TSH: $(0.4- 4) mU/L $and FT4:$ (7-18) pg/mL$. |
| [group2scaled.xlsx](http://www.mscs.mu.edu/~stevem/bala/group2scaled.xlsx) | Treated patients from time zero is created from NOPT.mat file. This dataset contains Id, Time, TSH, FT4, TPOAb and TGAb. Note: group2 patient’s TSH and FT4 values are all scaled to normal reference range of TSH: $(0.4- 4) mU/L $and FT4:$ (7-18) pg/mL$. |
| [group3scaled.xlsx](http://www.mscs.mu.edu/~stevem/bala/group3scaled.xlsx) | Untreated patients initially and then received treatment with Levothyroxine after developed hypothyroidism. This dataset is created from NOPT.mat file. It contains Id, Time, TSH, FT4, TPOAb and TGAb. Note: group3 patient’s TSH and FT4 values are all scaled to normal reference range of TSH: $(0.4- 4) mU/L $and FT4:$ (7-18) pg/mL$. |
| [group3scaleduntreated.xlsx](http://www.mscs.mu.edu/~stevem/bala/group3scaleduntreated.xlsx) | Group3 patients’ dataset before treatment. It is created from group3scaled.xlsx file |
| [patient99.xlsx](http://www.mscs.mu.edu/~stevem/bala/patient99.xlsx) | Patient #99 data is extracted from group1scaled.xlsx file (always untreated patients dataset).  |
| [patient103.xlsx](http://www.mscs.mu.edu/~stevem/bala/patient103.xlsx) | Patient #103 data is extracted from group1scaled.mat file (always untreated patients dataset). |
| [patient114.xlsx](http://www.mscs.mu.edu/~stevem/bala/patient114.xlsx) | Patient #103 data is extracted from group3scaleduntreated.mat file. |

## Matlab Files

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| File Name | File Description |
| [scatterplots.m](http://www.mscs.mu.edu/~stevem/bala/scatterplots.m) | This Matlab file contains codes for all scatter plots in Chapter 1. |
| [normal\_operation.m](http://www.mscs.mu.edu/~stevem/bala/normal_operation.m) | This Matlab file contains codes for simulating the reduced 2d model in Chapter 3. |
| [norm\_operation.m](http://www.mscs.mu.edu/~stevem/bala/norm_operation.m) | This Matlab file contains codes for simulating 3d model when Ab set to zero in Chapter 3. |
| [Disr\_feed.m](http://www.mscs.mu.edu/~stevem/bala/Disr_feed.m) | Using this Matlab file, one could generate all figures in Chapter 4. Note that $k\_{5}=1$ and $k\_{7}$ value changes for different arguments. |
| [bifurcation.m](http://www.mscs.mu.edu/~stevem/bala/bifurcation.m) | Using this file, one could generate all bifurcation diagrams in Chapter 4. |
| [euthyroid.m](http://www.mscs.mu.edu/~stevem/bala/euthyroid.m) | Using this file, one could generate euthyroidism $\rightarrow $ euthyroidism chart in Chapter 5. |
| [subclinicalhypo.m](http://www.mscs.mu.edu/~stevem/bala/subclinicalhypo.m) | Using this file, one could generate euthyroidism $\rightarrow $ subclinical hypothyroidism chart and the parameterized curve (by $k\_{7}$) in Chapter 5. |
| [clinicalhypo.m](http://www.mscs.mu.edu/~stevem/bala/clinicalhypo.m) | Using this file, one could generate euthyroidism $\rightarrow $ subclinical $\rightarrow $ clinical hypothyroidism chart and the parameterized curve (by $k\_{7}$) in Chapter 5. |
| [completechart.m](http://www.mscs.mu.edu/~stevem/bala/completechart.m) | Using this file, one could generate the complete euthyroidism $\rightarrow $ subclinical $\rightarrow $ clinical hypothyroidism chart and the parameterized curve (by $k\_{7}$) in Chapter 5. |
| [patient103.m](http://www.mscs.mu.edu/~stevem/bala/patient103.m) | Using this file, one could generate patient #103 clinical chart and the curve in TSH- FT4 phase plane.  |
| [patient114.m](http://www.mscs.mu.edu/~stevem/bala/patient114.m) | Using this file, one could generate patient #114 clinical chart and the curve in TSH- FT4 phase plane. |