RADIUS VALLEY: SURVEY SAMPLE NOTES & STATS

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Updated September 2023

Note: All files are uploaded to my github and linked!
Github: https://github.com/allypayne/radius-valley-ally

Part 1: Kepler Survey

From the NASA exoplanet archive:

- Exoplanet archive disposition= CONFIRMED
- Disposition score=1
- Planetary Radius Cuts: between 1.5 and 2 Earth radii
- # of planets pulled from the archive: 295
    - # of unique systems= 275 (some of the planets that meet the criteria are from the same system)

Applying data cuts:

Data frame for Kepler includes this info:

```
[221]: true_kep.columns

[221]: Index(['kepler_name', 'kepid', 'system', '# TTV', '# non TTV', 'size_sys',
              'circumbinary_flag', '# of stars', '# stars', 'eccentricity'],
             dtype='object')
```

- The eccentricity column gives a list of each planet's eccentricity value
- circumbinary_flag= 0 indicates there is not a circumbinary planet (all=0)

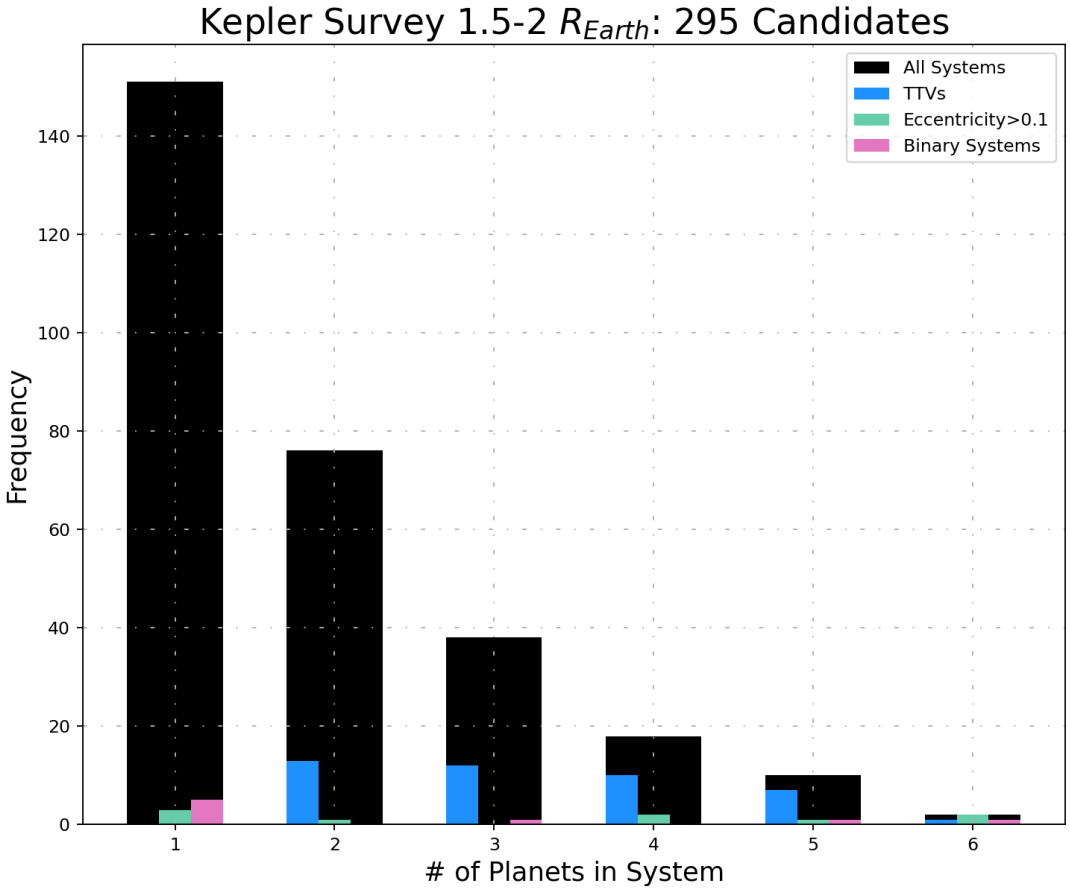
DATAFRAME name (before cuts): Full_Data_Kepler_Survey_RECENT.csv

- Contains 296 planets

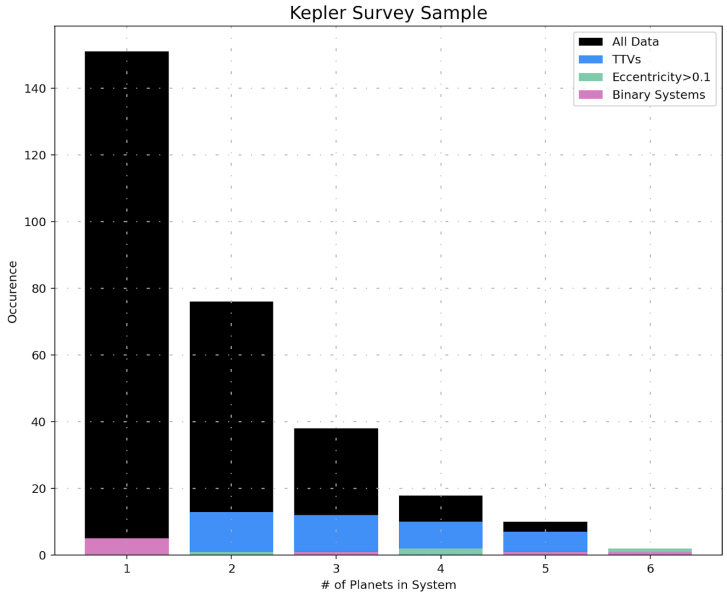
DATA CUTS:
binary systems: 8
eccentric systems (ecc>0.1): 9
planets with TTV: 43
of planets with size_sys>1: 144

After applying all cuts together our sample size= 98 planets and 75 unique systems (some of the planets that meet the criteria are from the same system)
DATAFRAME after all cuts based on above criteria: Kepler_Reduced_MultiPlanet.csv

Finished Plot:



old plot version:



Part 2: Extended Kepler Survey (0 to 3 Earth Rads included)

- Contains 1114 planets

From the NASA exoplanet archive:

- Exoplanet archive disposition= CONFIRMED
- Disposition score=1
- Planetary Radius Cuts: between 0 and 3 Earth radii
- # of planets pulled from the archive: 1114
    - # of multiplanet systems: 551
    - # of unique systems= 906 (some of the planets that meet the criteria are from the same system)

Data Table with all of collected info for the plots titled:

```
Index(['kepid', 'kepoi_name', 'kepler_name', 'koi_kepmag', 'system', '# TTV',
       '# non TTV', 'size_sys', 'circumbinary_flag', '# stars',
       'eccentricity'],
      dtype='object')
```

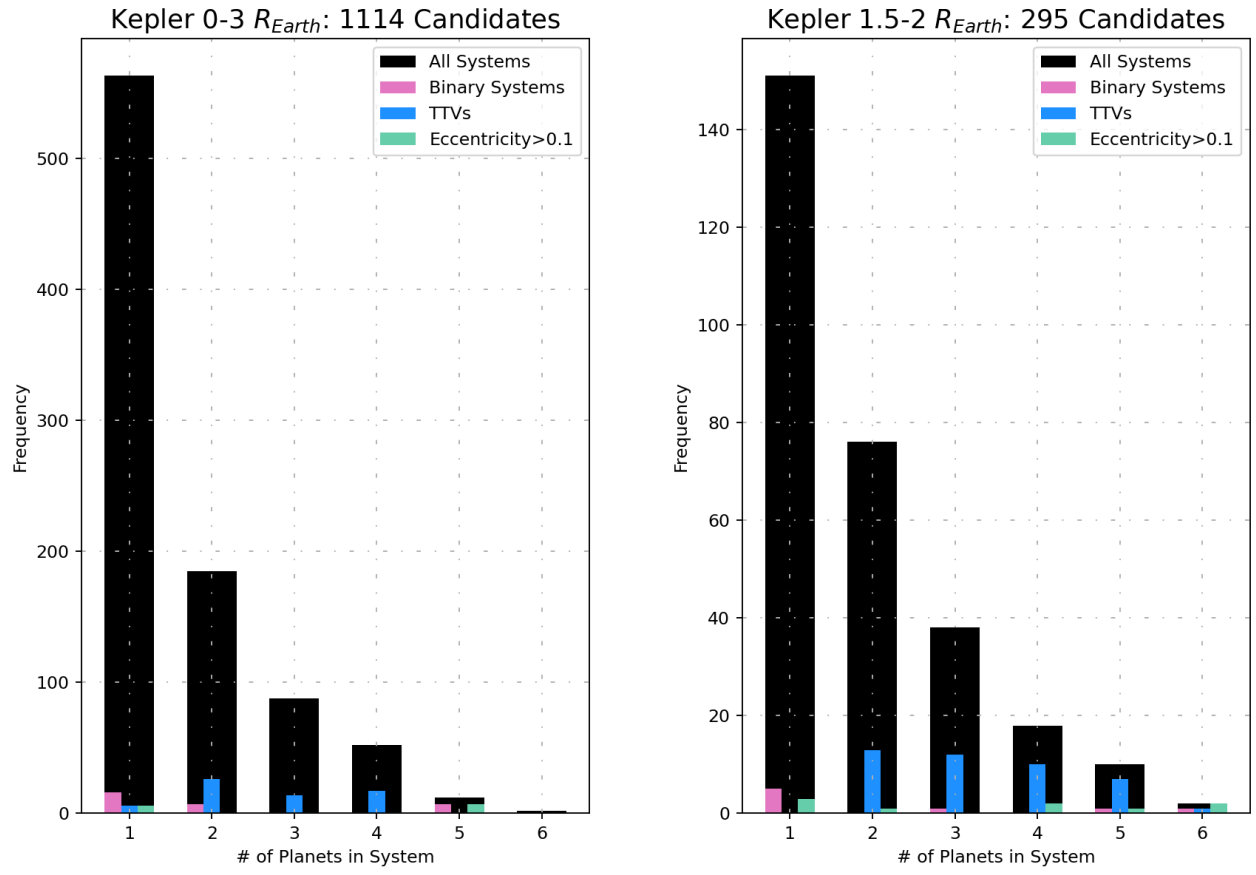
DATAFRAME name (before cuts): Kep_all_data_3rad.csv

DATA CUTS:
systems >1 star: 46
eccentric systems (ecc>0.1): 47
planets with TTV: 180
of planets with size_sys>1: 551
# of unique systems: 906

After applying all cuts together our sample size= 886 planets and 762 unique systems (some of the planets that meet the criteria are from the same system)

DATAFRAME csv with all cuts applied= **Kepler_0to3_AllSystems_CutsApplied.csv**

- This data frame includes systems all of the single and multi-planet systems



Part 3: TESS Survey

From the NASA exoplanet archive:

- TFOPWG Dispostion= CP (confirmed planet) or KP (known planet)
- Planetary Radius Cuts: between 1.5 and 2 Earth radii
- # of planets pulled from the archive: 45
    - Note: using xo_archive I was only able to get data for 21 of these planets (the rest would not show up using the search name method for unknown reasons)

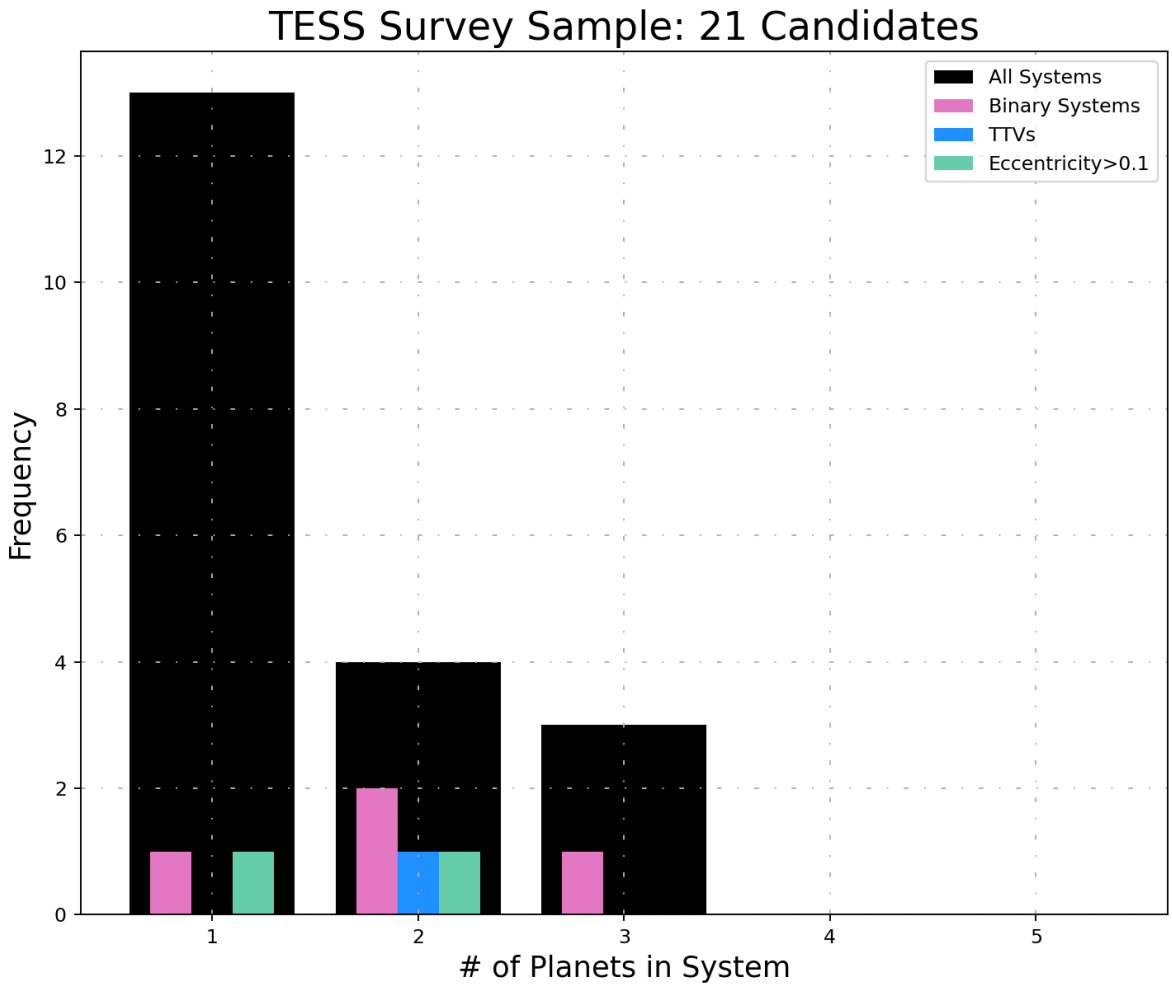
Applying data cuts:

Data frame for TESS includes this info:

```
Index(['toi', 'toipfx', 'pl_pnum', 'system', 'eccentric?', 'eccentricity',
       '# stars', 'cb_flag', 'ttv_flag', 'size_sys'],
      dtype='object')
```

- The eccentricity column gives a list with each planet's eccentricity value
- circumbinary_flag= 0 indicates there is not a circumbinary planet (all=0)

DATAFRAME name (before cuts): Full_Data_TESS_Survey.csv
DATA CUTS:
binary systems: 4 (out of 21)
eccentric systems (ecc>0.1): 2
planets with TTV: 1
of planets with size_sys>1: 8 (out of 21)
New # of systems: 15
DATAFRAME after all cuts based on above criteria: TESS_Reduced_AllSystems.csv



Old plot version: