# Contractual Obligation Paper

Tricia McMillan

March 1, 2016

## 1 This is Section 1

This is some text. Some of the text is *set in italics* and some is **set in bold**. The author is visiting from the Sirius Cybernetics Corporation where she holds the post of Professor of Vogon poetry[1]. Professor McMillan is currently researching adapting the Moon as a concert venue[2].

[3]

This is an equation $\nabla \cdot B = 0$ in the middle of a line.

This is an equation on it own line:

$$\nabla \cdot D = \rho$$

This is an equation on its own line with an equation number:

$$\nabla \times H = J + \frac{\partial D}{\partial t} \tag{1}$$

This seems like a good place to put a table.

| Name | Sym | RA | Dec | Flag |
|---|---|---|---|---|
| Aquarius | AQR | 22.40784 | -10.15606 | ZA |
| Taurus | TAU | 4.42213 | 16.83941 | ZA |
| Virgo | VIR | 13.28989 | -2.63866 | ZA |

Table 1: This is a Table

## 1.1 This is a subsection of section 1

LaTeX has its own idea about where tables and figure go. Sometimes it will place them where you want and sometimes it will decide it does not like what you want and will place them where it thinks it is best. Do not worry about it.

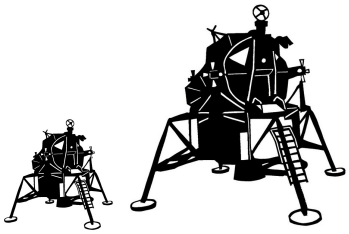

Figure 1: A couple of figures with a common caption.

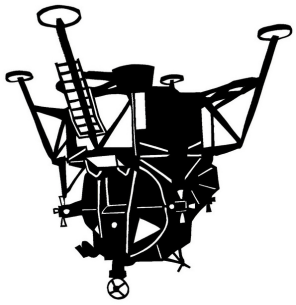

Figure 2: A single figure (upside down).

| Name | Mass($M_\oplus$) | SM Axis(AU) | Period(days) |
|---|---|---|---|
| Mercury | 5.5773 x $10^{-50}$ | 0.3871 | 87.969 |
| Venus | 0.814996 | 0.723333 | 224.700 |
| Mars | 0.107447 | 1.5236 | 686.979 |
| Jupiter | 317.828 | 5.2034 | 4332.820 |

Table 2: Here is the 4x4 table

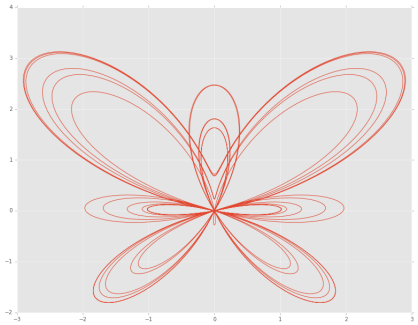

Figure 3: Here is the graph of a butterfly

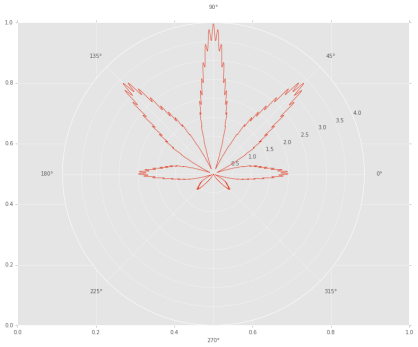

Figure 4: Here is the graph of a "plant"

$$\frac{M_{\odot}}{M}\int_{\pi}^{2\pi}\int_{0}^{\hbar}\sin(\omega\pi)\frac{1}{\sqrt{x!-6}}dxd\omega \tag{2}$$

$$r=(1+0.9cos(8t))(1+0.1cos(24t))(0.9+0.05cos(200t))(1+sin(t)) \tag{3}$$

$$-\pi<t<\pi \tag{4}$$

Above is a graph of a pot leaf. I google'd "cool polar graphs" and I found this. The graph was one entire equation (3), which made it easy to type into python. I graphed it using polar coordinates. I originally had trouble graphing the butterfly, until I realized that I had accidentally swapped the x and y axis'. The butterfly graph is NOT in polar coordinates. [4]

Here is a better paragraph about one of my favorite bands, Muse (since I am currently listening to them). [5]I saw Muse in concert in Los Angeles three years ago after they released their album "The 2nd Law." [6]It is one of their more unusual albums since they focused heavily on the use of electronic instruments rather than their usual focus on vocals,

guitar, bass, drums, etc.[7] Their new sound let them proceed to make newer music with newer sounds, rather the same ole' Muse. This fresher sound became apparent in their newest album "Drones." [8]

Here is a final bit of text referencing Figure 2 and Table 1.

# References


[1] Douglas Adams. *The Hitchhiker's Guide to the Galaxy*. Pan Books, 1979.

[2] P. D. Spudis, D. E. Wilhelms, and M. S. Robinson. The Sculptured Hills of the Taurus Highlands: Implications for the relative age of Serenitatis, basin chronologies and the cratering history of the Moon. *Journal of Geophysical Research (Planets)*, 116(E15):0, December 2011.

[3] R. L. Jones, B. Gladman, J. Kavelaars, J. Petit, J. W. Parker, and P. Nicholson. The Unusual TNO 2004 XR190 (aka "Buffy"). In *AAS/Division for Planetary Sciences Meeting Abstracts #38*, volume 38 of *Bulletin of the American Astronomical Society*, page 550, September 2006.

[4] The LIGO Scientific Collaboration and the Virgo Collaboration. Properties of the binary black hole merger GW150914. *ArXiv e-prints*, February 2016.

[5] N. I. Shakura and R. A. Sunyaev. Black holes in binary systems. Observational appearance. A&A, 24:337–355, 1973.

[6] C. Leitherer, S. Ekström, G. Meynet, D. Schaerer, K. B. Agienko, and E. M. Levesque. The Effects of Stellar Rotation. II. A Comprehensive Set of Starburst99 Models. ApJS, 212:14, May 2014.

[7] R. Margutti, D. Milisavljevic, A. M. Soderberg, R. Chornock, B. A. Zauderer, K. Murase, C. Guidorzi, N. E. Sanders, P. Kuin, C. Fransson, E. M. Levesque, P. Chandra, E. Berger, F. B. Bianco, P. J. Brown, P. Challis, E. Chatzopoulos, C. C. Cheung, C. Choi, L. Chomiuk, N. Chugai, C. Contreras, M. R. Drout, R. Fesen, R. J. Foley, W. Fong, A. S. Friedman, C. Gall, N. Gehrels, J. Hjorth, E. Hsiao, R. Kirshner, M. Im, G. Leloudas, R. Lunnan, G. H. Marion, J. Martin, N. Morrell, K. F. Neugent, N. Omodei, M. M. Phillips, A. Rest, J. M. Silverman, J. Strader, M. D. Stritzinger, T. Szalai, N. B. Utterback, J. Vinko, J. C. Wheeler, D. Arnett, S. Campana, R. Chevalier, A. Ginsburg, A. Kamble, P. W. A. Roming, T. Pritchard, and G. Stringfellow. A Panchromatic View of the Restless SN 2009ip Reveals the Explosive Ejection of a Massive Star Envelope. ApJ, 780:21, January 2014.

[8] R. T. H. Barnes, R. Hide, A. A. White, and C. A. Wilson. Atmospheric angular momentum fluctuations, length-of-day changes and polar motion. *Proceedings of the Royal Society of London Series A*, 387:31–73, May 1983.