

## A PONDERING OF THE PASTEL PONY PIGMENTATION PUZZLE

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### INTRODUCTION

Since the debut of the My Little Pony: Friendship is Magic, pony enthusiasts have designed and drawn thousands of their own original characters (OCs). The coloration of many OCs deviate from the look and feel of those used for characters in the show. While many of these original designs use intentionally unique coloration, quantitative knowledge of genuine Equestrian colors may still pique the interest of fans and artists. The goal of this paper is to analyze the color demographics of Equestria's pony population. An algorithm is presented to randomly generate coat and mane colors that match these demographics, and ten such randomly-generated characters are presented as a demonstration and test of the study.

### COLLECTING SAMPLE DATA

The "List of Ponies" Wiki contains a plethora of pony color data, organized by race (pegasus, unicorn, earth pony, crystal pony, or alicorn), gender, and age [1]. For this study, crystal ponies and alicorns were omitted. Colors were recorded from the web pages by taking large screenshots with the assistance of the Full Page Screen Capture extension available for Google Chrome [2]. FreeMat was then used to scan the images along the columns that display the coat and mane colors and extract the data in RGB format [3]. Under the assumption that hue, saturation, and value (brightness) are more relevant variables in designing a character color scheme, the RGB quantities were converted to HSV quantities before further analysis.

Before extracting the colors, the image of each pony was observed manually, and the entry was discarded if the image appeared heavily tinted or the colors otherwise biased or distorted. For example, data for Rosewood Brook, a unicorn appearing in Granny Smith's memory, was discarded due to the character's colors being artificially limited to shades of sepia.

### ANALYSIS OF THE MARE DATA

The data for mares and for stallions were kept separate, in order to allow for a comparison of the color demographics between the two groups. Figures 1 through 6 show histograms of the hues, saturations, and values for the coats and primary mane color of Equestrian mares.

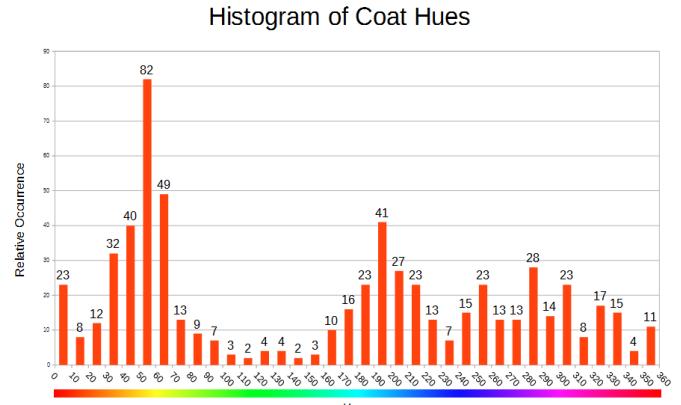


Figure 1. Histogram of Coat Hues for Equestria's Mares

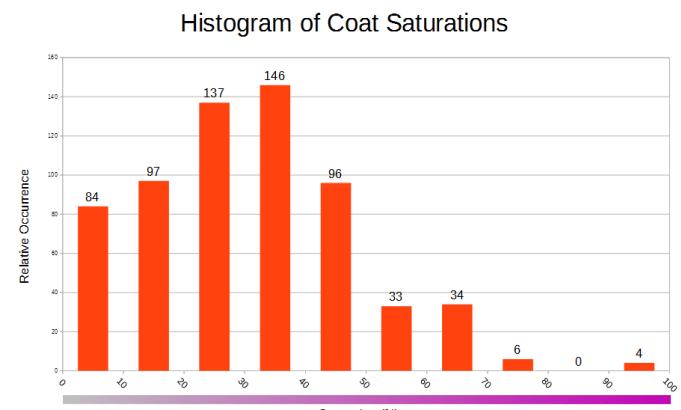


Figure 2. Histogram of Coat Saturations for Equestria's Mares

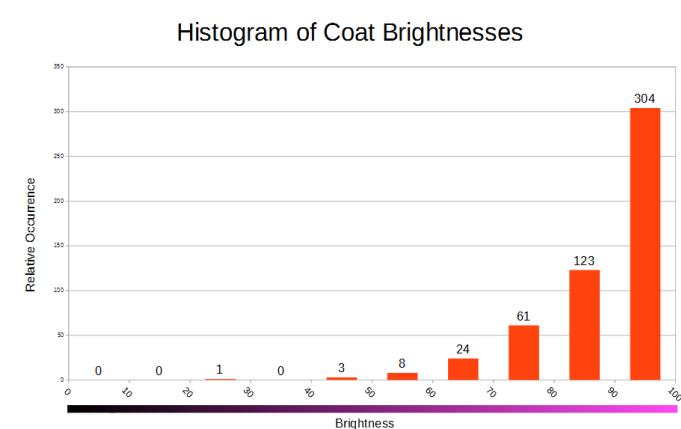
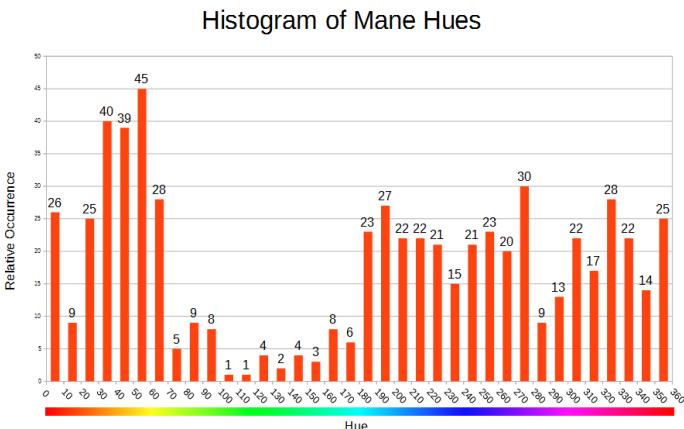
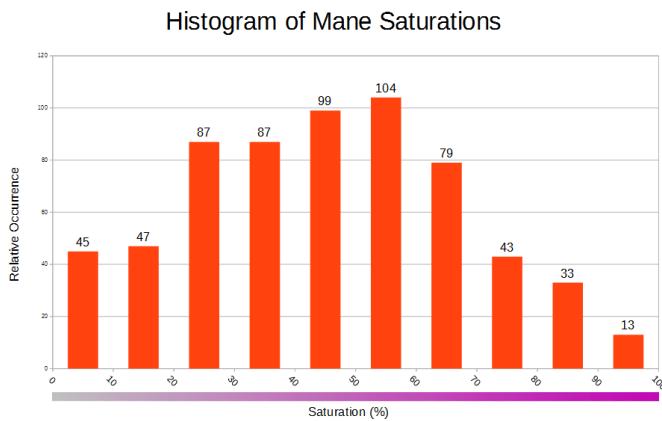


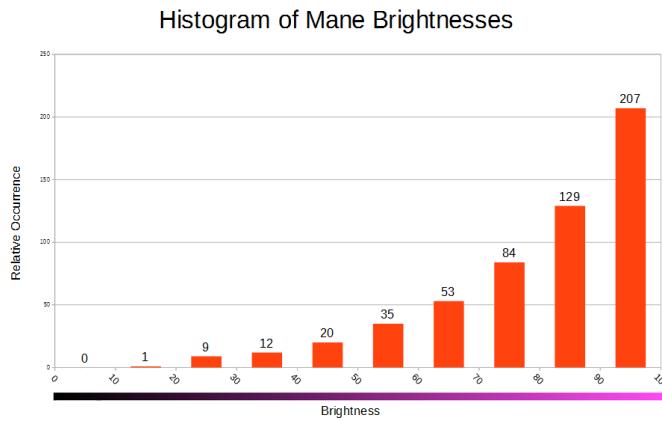
Figure 3. Histogram of Coat Brightnesses for Equestria's Mares



**Figure 4. Histogram of Mane Hues for Equestria's Mares**



**Figure 5. Histogram of Mane Saturations for Equestria's Mares**

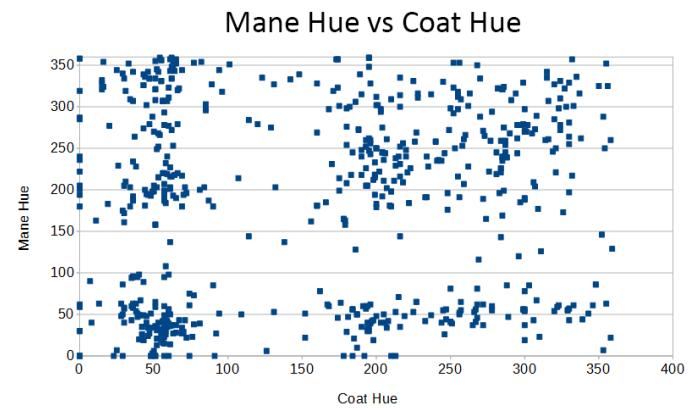


**Figure 6. Histogram of Mane Brightnesses for Equestria's Mares**

Hues across the entire spectrum are present in both the coats and manes of Equestrian mares. However, it is evident that hues in the green/turquoise range from  $\sim 100^\circ$  to  $\sim 160^\circ$  are avoided for both the coats and the manes, while an orangish yellow is the most common hue for both. Saturation values for the coat tend on the lower side, with  $\sim 35\%$  being the most common level, while the histogram for mane saturation is

flatter and shifted right. Very high saturation values for the manes are less common than lower saturations, but are not as rare as high *coat* saturations. Conversely, brightness values are notably very high for the coats, with 90% of mares having a coat brightness of 75 or higher and the largest group being in the 90-100 range. Mane brightnesses also tend to be high, although very low brightnesses are also possible. The histograms for coat brightness and mane brightness are similar in shape, but the mane brightness trails off more to the lower values.

The apparent similarity of the two hue histograms, the two saturation histograms, and the two brightness histograms might appear to imply that these respective pairs of quantities are strongly linked to each other in some way. However, a plot of mane hues vs coat hues reveals no obvious correlation (figure 7). On the contrary, they now appear to be independent variables.



**Figure 7. Scatterplot of Mane Hues vs Coat Hues for Equestrian Mares**

Likewise, plotting every possible pair of items (coat hue vs coat saturation, coat brightness vs mane hue, etc.) shows no immediately obvious correlation between *any* of the six items (although a distance covariance test does show that not all of the variables are completely independent. See the section titled *A Closer Look at Variable Independence*, below).

## ANALYSIS OF THE STALLION DATA

Figures 8-13 show the distributions of hue, saturation, and brightness in the coats and manes of the stallions. The histogram of stallion coat hues is somewhat similar to that of the mares, except that there's a significant diminishment in the range  $\sim 260^\circ$ - $340^\circ$ . Like the mares, few stallions exhibit coats and manes in the green/turquoise range. The stallions' mane hues histogram is less similar to that of the mares, but again shows a significantly diminished occurrence of hues in that upper range of  $\sim 260^\circ$ - $340^\circ$ . There is also a noticeable spike around the range  $210^\circ$ - $220^\circ$ .

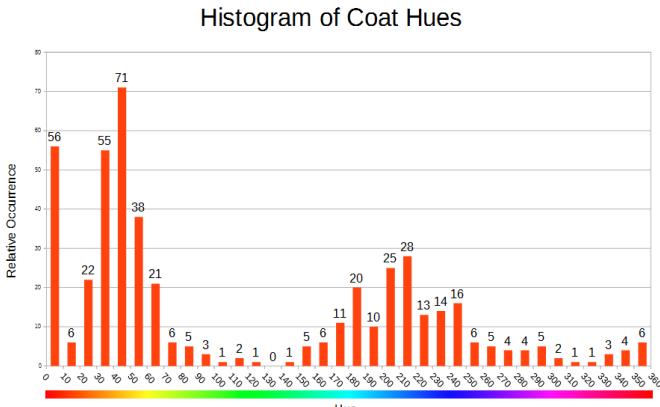


Figure 8. Histogram of Coat Hues for Equestria's Stallions

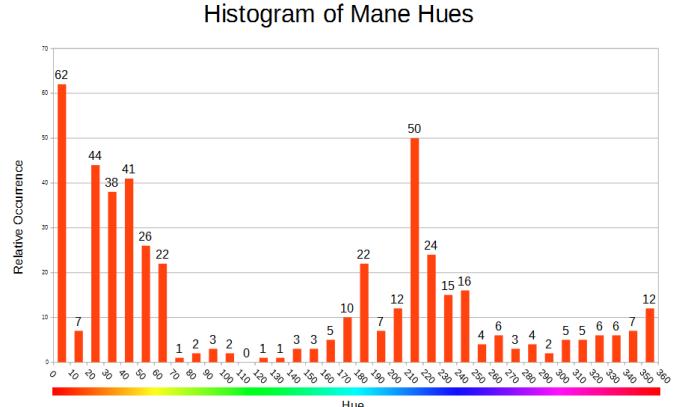


Figure 11. Histogram of Mane Hues for Equestria's Stallions

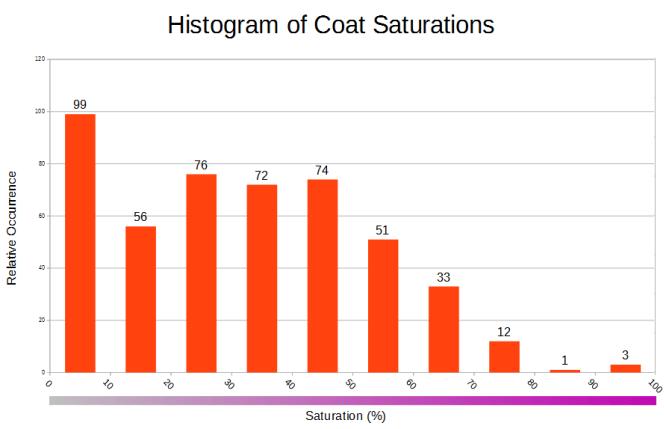


Figure 9. Histogram of Coat Saturation for Equestria's Stallions

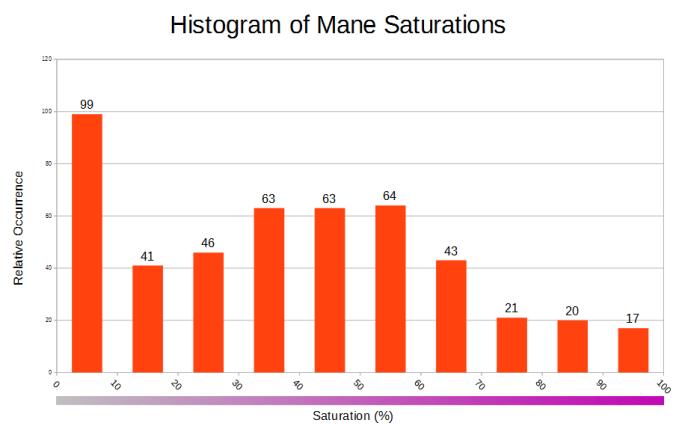


Figure 12. Histogram of Mane Saturation for Equestria's Stallions

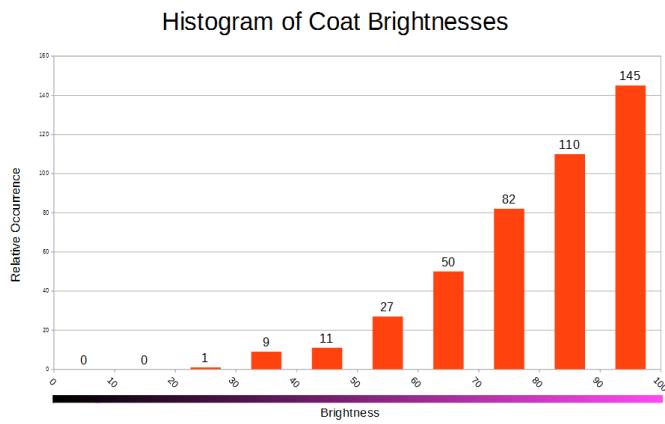


Figure 10. Histogram of Coat Brightnesses for Equestria's Stallions

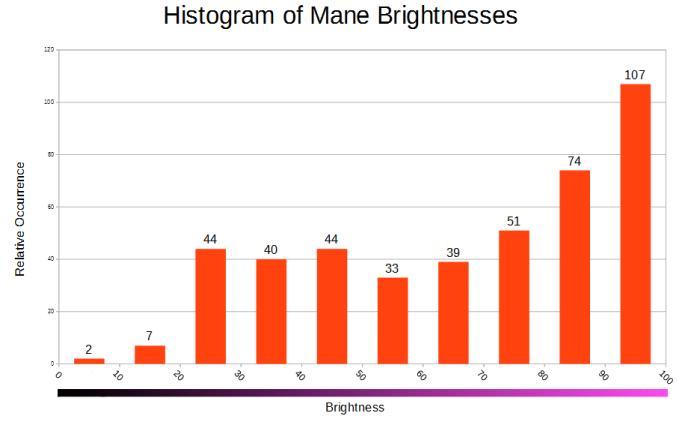


Figure 13. Histogram of Mane Brightnesses for Equestria's Stallions

The saturation histograms are similar between the mares and the stallions except that the stallions exhibit a spike in the number of samples at the extreme low end of both histograms (0-10% saturation). Brightness distributions for the stallions' coats and manes spread out further into the lower values than they do for the mares. Still, the brightnesses tend towards the higher values, and almost no stallion has a coat brightness

below 30 while only a handful have mane brightnesses below 20. The shape of the brightness histogram for the stallion manes is also slightly different than the other brightness histograms, being relatively flatter from around 70 to 20, and then sharply dropping off for lower values.

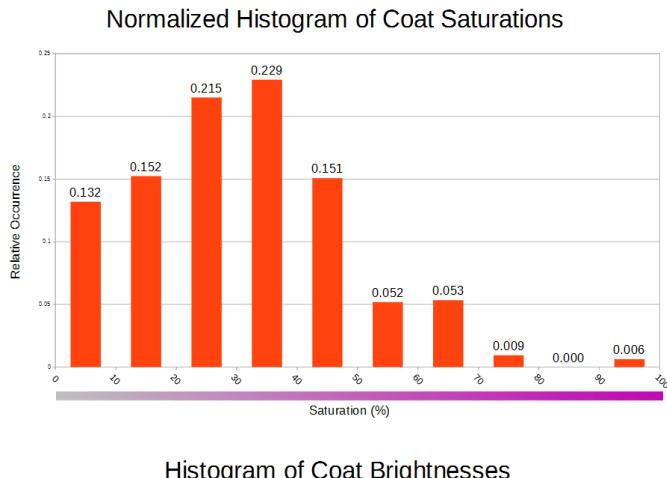
Once again, plotting each type of data against every other shows no immediately apparent correlations.

## A PROCEDURE FOR PRODUCING PONY PIGMENTATION

An algorithm is presented below for generating a population of coat and mane colors that matches the histograms shown in figures 1-6 and 8-13. Five mare color schemes and five stallion color schemes taken directly from this algorithm are presented for discussion. For this algorithm, it is assumed that all the types of data (hues, saturations, and brightnesses for the mane and for the coat) are independent of each other, and can thus be generated independently.

None of the probability density functions (pdfs) for the hues, implied by the histograms in figures 1, 2, 8, and 9, closely follow any single standard pdf. While an estimation of each pdf could conceivably be made by combining together several Gaussian distributions, the algorithm below opts for a numerical approach that will produce numbers that follow each histogram more precisely and can be universally applied to *all* of the histograms.

Normalized histograms can be used as an estimation of their respective pdfs. Histograms are normalized by dividing every value by the total number of samples, thus ensuring that the sum of values is equal to unity without changing the shape of the distribution. Figure 14 below shows the normalized histogram for mare coat saturation:

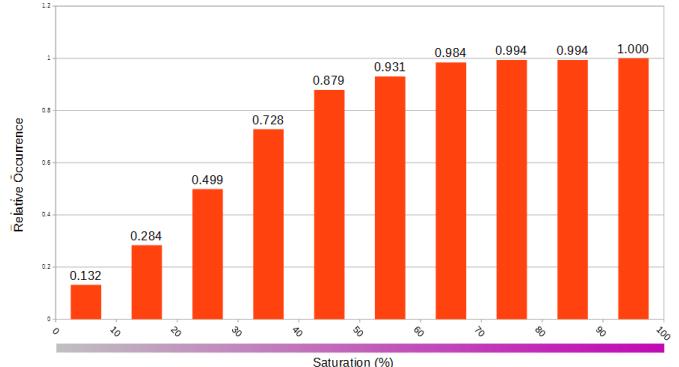


**Figure 14. Normalized Histogram of Mare Coat saturations.**

The goal is to produce a random population of  $n$  ponies, where  $n$  is any positive integer we choose. When determining a quantity such as coat hues, we must determine what fraction of these  $n$  ponies will belong to each band of hues. Ideally, for a truly randomly-generated population, the fraction of ponies will not be hard-coded, but rather allowed to be *generated* probabilistically, using the normalized histogram as a weighting function. To do this, we first create a "cumulative" histogram, which simply takes the sum of the histogram entries

from left to right. Figure 15 below, for example, shows the cumulative histogram derived from figure 14:

Cumulative Normalized Histogram of Coat Saturations



**Figure 15. Cumulative Normalized Histogram for Mare Coat Saturations**

Note that the last entry in the cumulative histogram is always 1, the sum of all the histogram entries. Next, we generate an array of  $n$  values, all between 0 and 1, with a uniform distribution. This is easily achieved using the built-in FreeMat function `rand(1,n)`.

```
randgen = rand(1,n)
```

We can perform logical tests on these randomly-generated numbers to see whether they exist in a given range. For example, we can find all the randomly-generated numbers that are between 0.284 and 0.499 and store their locations in the array indexes using the following command:

```
indexes = find(randgen>0.284&randgen<=0.499)
```

Note that 0.284 and 0.499 are the values of the cumulative histogram in figure 15 for saturations up to 20% and saturations up to 30%, respectively. The difference, 0.215 is the fraction of mares who had coat saturations between 20% and 30% (this is confirmed by looking at figure 14). Hence, the ponies at these indexes should all have their coat saturations chosen to be between 20% and 30%. A random distribution in this range can be applied to them as follows:

```
generated_coat_saturation(indexes) =  
    0.1*rand(1,length(indexes))+0.2
```

This procedure can be automated across the entire cumulative histogram, filling in all  $n$  coat saturations. The procedure can be applied equally as well to coat hues, coat brightnesses, mane hues, etc.

A sample of 100 color schemes was randomly generated for both mares and stallions, and the first five of each are presented in figure 16.



**Figure 16. Ten Pony Color Schemes Generated by the Algorithm.**

While not a perfect set, all of these ponies at least exhibit an appropriate range of hues, saturations and brightnesses that are similar their Equestrian kin. Subjectively, it could be said that ponies #3, #4 and #8 appear a little oversaturated, and indeed their coat saturation levels are all towards the higher end of the respective histograms (#3 is 49%, #4 is 59%, and #8 is 58%). Number 9's coat, however, actually has the highest level of saturation, at 62%. It could also be said that some of the ponies' color combinations could be more aesthetically pleasing. Nevertheless, a few of the ponies have very decent coloration. The author's personal favorite is #6.

#### A CLOSER LOOK AT VARIABLE INDEPENDENCE

The algorithm in the previous section assumed that all the color variables could be treated as completely independent, because the scatter plots were spread out and exhibited no obvious correlation. A more confident measure of independence can be achieved mathematically by performing a distance covariance test of independence [4]. Each type of data will be tested against every other, one pair at a time.

Let  $X_i$  and  $Y_i$  ( $i = 1, 2, \dots, n$ ) represent the two sets of data to be compared. The first step in performing a distance covariance test is to scale the data to ensure that the test is affine-invariant. For data in  $\mathbb{R}^1$ , the scaling factors are simply the reciprocal of the standard deviations:

$$X^* = X/\sigma(X)$$

$$Y^* = Y/\sigma(Y)$$

Before the distance covariance can be determined, the following quantities must be computed for  $X$ :

$$a_{kl} = |X_k - X_l| \quad \bar{a}_{k\bullet} = \frac{1}{n} \sum_{l=1}^n a_{kl}$$

$$\bar{a}_{\bullet l} = \frac{1}{n} \sum_{k=1}^n a_{kl} \quad \bar{a}_{\bullet\bullet} = \frac{1}{n^2} \sum_{k=1}^n \sum_{l=1}^n a_{kl}$$

$$A_{kl} = a_{kl} - \bar{a}_{k\bullet} - \bar{a}_{\bullet l} + \bar{a}_{\bullet\bullet}$$

Similarly,  $b_{kl}, \bar{b}_{k\bullet}, \bar{b}_{\bullet l}, \bar{b}_{\bullet\bullet}$ , and  $B_{kl}$  are computed for  $Y$ .

Then, the distance covariance is defined as the square root of

$$v_n^2(X, Y) = \frac{1}{n^2} \sum_{k=1}^n \sum_{l=1}^n A_{kl} B_{kl}$$

One last quantity must be found before the test statistic is determined:

$$S_2 = \left( \frac{1}{n^2} \sum_{k=1}^n \sum_{l=1}^n |X_k - X_l| \right) \left( \frac{1}{n^2} \sum_{k=1}^n \sum_{l=1}^n |Y_k - Y_l| \right) \\ = \bar{a}_{\bullet\bullet} \bar{b}_{\bullet\bullet}$$

Finally, the test statistic is computed as

$$\frac{n v_n^2(X, Y)}{S_2}$$

Choosing a significance level of  $\alpha$ , the null hypothesis that the data are *independent* is *rejected* if the following is true:

$$\frac{n v_n^2(X, Y)}{S_2} > \left( \Phi^{-1} \left( 1 - \frac{\alpha}{2} \right) \right)^2$$

where  $\Phi^{-1}(\cdot)$  is the inverse standard normal cumulative distribution function. Tables 1 and 2 summarize the results of all the independence tests for mares and for stallions, at a significance level of 5%.

**Table 1. Covariance Independence Test Results for Mares.**  
**"Ind"** indicates that the two variables are independent, while  
**"Dep"** indicates that the data failed the distance covariance test and are therefore not independent.

Mares	Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
Coat Hue	—	Dep	Dep	Dep	Dep	Ind
Coat Saturation	Dep	—	Ind	Ind	Ind	Ind
Coat Value	Dep	Ind	—	Ind	Dep	Dep
Mane Hue	Dep	Ind	Ind	—	Ind	Dep
Mane Saturation	Dep	Ind	Dep	Ind	—	Dep
Mane Value	Ind	Ind	Dep	Dep	Dep	—

**Table 2. Covariance Independence Test Results for Stallions.**  
**"Ind"** indicates that the two variables are independent, while  
**"Dep"** indicates that the data failed the distance covariance  
test and are therefore not independent.

Stallions	Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
Coat Hue	—	Dep	Ind	Dep	Ind	Ind
Coat Saturation	Dep	—	Ind	Ind	Dep	Dep
Coat Value	Ind	Ind	—	Ind	Dep	Ind
Mane Hue	Dep	Ind	Ind	—	Dep	Dep
Mane Saturation	Ind	Dep	Dep	Dep	—	Dep
Mane Value	Ind	Dep	Ind	Dep	Dep	—

These results show that there are many pairs of variables that have some level of dependency on each other. The actual relationships are yet to be determined, and could be very subtle. For the pairs of variables that passed the distance covariance test for independence, it can be said with a good degree of confidence that those variables are independent of each other.

#### DATA BIAS, RESEARCH CHALLENGES, AND ROOM FOR IMPROVEMENT

There are a couple of biases in the data that are worth mentioning. First, note that all of the hue histograms have a peculiar spike at a hue of  $0^\circ$ . This is because when the saturation of a color is 0%, hue becomes irrelevant and defaults to  $0^\circ$ . Obviously, this means that the algorithm will produce more red ponies than are present in a true Equestrian population. Such a bias might be filtered out by redistributing the hues of all the grey ponies. Secondly, although the list of ponies was manually scrutinized before data extraction, mildly-tinted images may still be present in the data. A common tint that is applied for nighttime scenes makes the ponies appear bluer, so it is suspected that the hue histograms are slightly biased towards blue.

Distance covariance tests were performed to see whether the data types could be shown *mathematically* to be independent. A number of data pairs passed the test, but unfortunately, many of the pairings did not. That is, there is likely some relationship (though evidently weak) between those data pairs. A thorough understanding of all the relationships is lacking and may be very difficult to nail down.

There are obviously many ways to expand the current study and refine its results. Eye color data can be easily incorporated into the study, as it is included along with the coat and mane data in the List of Ponies wiki. Other colors, such as secondary mane colors and character outline colors, would require additional work to incorporate since these colors are not

included in the wiki and would have to be measured and recorded manually. A quick preliminary observation suggests that the character outlines retain a similar hue to the part that they are outlining, but have slightly higher saturation and lower brightness. A more complete study would be desirable to confirm and quantify this relationship across all hues, saturations, and brightness levels. Another way to expand the current research would be to include crystal ponies in the data set. Note that, due to the shifting brightness and saturation levels across their coats and manes while in "crystalline" form, crystal pony data may need to be subjected to closer scrutiny. A study of this special texturing of a crystal pony's colors would make a nice complement to this research.

#### CONCLUSIONS

The histograms reveal the shapes of the probability density functions for the hue, saturation, and brightness of Equestrian ponies' coats and manes. The range of hues from  $\sim 100^\circ$  to  $\sim 160^\circ$  (green-turquoise) is curiously avoided for all ponies. It has been suggested by The L-Train that these hues might be avoided since they are similar to those used for the grass and tree leaves that are common to the setting of Ponyville [5]. An amusing implication of this is that camouflage has played a negative evolutionary impact on ponykind. Additionally, the range of hues from  $\sim 260^\circ$  to  $\sim 340^\circ$  is diminished for the stallions. Perhaps this range was avoided for the male characters because it includes the various hues of pink, a color traditionally associated with femininity.

A computer algorithm, making a couple of simplifying assumptions, can be designed to produce pony colors in an appropriate range to match the demographics of Equestria's pony population. The less-than-perfect aesthetics of the color schemes indicates that the algorithm's assumptions may be a little flawed, and distance covariance tests indeed indicate that several pairs of variables are not truly independent. A closer study of the relationships between the variables could lead to an improved algorithm. Still, the colors produced by this simple design are not very far off.

#### REFERENCES

- [1] "List of ponies," accessed Oct. 11, 2015,  
[http://mlp.wikia.com/wiki/List\\_of\\_ponies](http://mlp.wikia.com/wiki/List_of_ponies)
- [2] Coles, P., "Full Page Screen Capture," 2015, retrieved from  
<https://chrome.google.com/webstore/category/extensions>
- [3] Basu, S. "FreeMat," stable release version 4.2, June 30, 2013, <http://freetmat.sourceforge.net/>
- [4] Szekey, G., Rizzo, M., and Bakirov, N, "Measuring and Testing Dependence by Correlation of Distances," *The Annals of Statistics*, Vol 35, No 6 (2007): 2769-2794.
- [5] The L-Train, electronic message to author, October 13, 2015

## APPENDIX A: EXTRACTED DATA FROM THE LIST OF PONIES WIKI

### Mare Data

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
240	1	96	258	52	65
46	16	97	24	62	71
324	4	100	310	24	100
63	15	98	349	69	83
53	25	99	215	80	100
198	30	99	19	69	91
295	22	98	278	71	73
323	29	96	298	58	48
46	47	98	342	100	86
207	64	96	202	30	100
63	25	94	253	28	99
204	2	91	275	36	84
330	30	100	255	56	65
301	33	96	270	67	75
46	14	95	34	23	43
311	33	83	126	15	85
247	33	90	44	60	100
66	40	99	279	81	78
185	24	97	21	67	80
74	77	88	61	38	98
216	69	63	231	38	69
200	18	91	250	42	55
286	34	97	275	41	79
33	41	73	352	73	88
200	42	92	312	48	93
34	39	91	203	21	87
120	2	97	279	100	74
57	50	100	278	14	100
193	42	100	252	50	100
57	9	100	220	75	80
57	9	100	220	75	80
57	9	100	220	75	80
54	26	99	32	70	27
36	54	89	192	30	79
198	43	91	43	52	97
330	34	77	329	29	92
59	48	99	240	43	70
272	39	89	37	62	100
332	7	87	217	46	93
0	0	87	319	93	73
53	19	67	32	38	56
142	12	100	333	56	85
57	62	100	199	54	84
57	45	89	187	80	82
160	42	100	181	23	92
204	44	95	245	10	95
204	12	51	192	6	98
225	26	99	331	26	96
268	19	67	350	15	76
60	14	91	311	49	58
175	29	91	199	45	80
199	47	96	233	51	91
69	32	100	217	32	94
76	12	100	23	88	75
60	20	100	56	44	100
65	14	99	190	60	83
30	40	89	205	19	91
296	18	63	120	20	52
61	17	97	36	62	100
57	36	94	35	70	100
0	0	97	30	22	35
338	78	77	262	53	87
212	54	69	211	82	51
321	50	100	221	68	97
184	34	92	56	37	97
288	26	100	239	70	75
23	54	75	0	0	100
138	19	95	137	59	57
131	16	95	327	40	100
216	2	94	335	39	99
60	32	99	277	29	91
43	34	91	326	42	73
268	21	87	46	36	99
58	27	98	30	68	94
51	6	99	321	28	100
276	30	89	222	11	93
42	20	95	35	81	96
60	17	96	51	50	89
348	13	99	86	67	86
62	15	100	334	91	64
285	38	75	169	29	89
282	5	94	322	54	74
270	47	84	288	45	88
356	28	63	325	25	53
226	32	84	258	26	73

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
290	33	66	268	41	68
262	31	63	301	30	62
242	39	73	236	49	74
71	4	97	203	44	82
300	30	91	270	51	71
315	5	93	335	45	85
216	15	98	252	51	94
179	44	86	158	10	98
46	17	100	194	46	90
36	91	77	234	48	50
278	26	78	55	20	92
202	43	71	222	6	64
263	4	80	316	26	84
57	39	87	194	27	82
59	39	89	307	31	91
220	21	79	248	43	56
190	18	90	218	55	55
294	33	84	316	24	35
258	29	89	253	37	45
30	31	93	334	53	91
30	2	99	172	69	90
60	42	100	98	65	98
90	5	100	85	36	100
267	35	87	41	59	98
274	40	53	165	5	64
114	28	91	144	37	35
109	26	97	50	42	96
15	55	88	321	40	53
281	22	73	245	55	59
287	22	73	245	14	71
219	52	46	48	63	72
195	47	65	247	63	53
43	74	89	89	72	62
350	22	95	325	39	60
58	19	98	26	42	91
53	26	77	268	45	46
322	17	94	59	40	94
56	6	99	16	54	100
162	35	92	78	66	94
256	28	94	52	41	86
31	68	89	319	63	60
55	33	94	20	56	95
61	22	100	201	33	92
330	7	99	264	25	76
81	28	76	39	58	65
148	33	78	339	34	70
196	18	87	243	26	29
13	19	97	63	36	100
49	8	98	3	51	90
45	12	97	48	38	93
310	33	82	23	34	24
187	36	90	10	87	37
315	3	94	342	78	59
19	23	70	183	43	91
228	3	70	316	36	64
289	20	78	47	13	98
180	7	95	298	16	83
333	31	95	61	82	98
37	67	95	264	37	78
213	8	93	238	79	26
57	47	91	23	68	99
160	26	88	269	51	71
0	0	98	0	0	98
170	26	64	231	50	42
36	58	100	58	29	98
335	29	98	336	72	97
330	29	100	197	51	100
57	39	95	207	37	78
320	61	68	327	30	92
52	12	100	345	69	69
44	11	98	181	34	93
45	53	93	40	2	99
74	42	90	0	0	98
69	30	100	34	73	100
196	45	96	328	27	95
52	56	90	203	47	98
44	26	86	200	3	88
195	50	100	348	59	91
28	65	87	48	49	98
57	32	100	95	62	87
0	0	88	358	12	86
205	25	63	211	13	87
192	27	96	0	0	92
252	3	60	353	31	94
65	15	91	37	43	53

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
307	18	100	273	40	71
62	40	100	37	78	92
60	17	97	323	73	77
101	47	95	351	57	92
222	8	94	184	34	58
260	4	79	266	33	74
65	20	98	352	81	97
36	65	81	95	57	81
51	27	98	355	58	100
205	34	100	50	23	99
35	71	95	60	34	100
94	24	97	344	83	90
61	46	94	137	66	85
131	22	87	53	30	93
40	64	97	98	55	94
94	45	86	51	34	100
34	31	96	309	8	98
35	65	81	94	57	81
56	26	99	42	60	97
91	52	96	0	0	100
126	25	95	6	68	77
51	27	98	36	77	100
89	24	87	327	26	91
62	34	91	359	39	98
59	41	95	42	80	95
57	42	95	293	54	73
353	11	93	7	33	96
77	42	96	353	69	95
39	45	86	51	34	96
54	32	83	359	48	66
57	17	99	0	0	100
69	18	99	180	33	98
295	21	100	244	47	57
7	69	78	90	71	96
25	34	98	7	50	100
194	40	100	40	38	60
50	60	100	198	46	83
299	29	98	279	86	100
26	38	56	229	42	60
216	29	81	35	63	79
255	27	93	216	56	68
300	13	85	189	11	94
285	36	95	321	59	75
353	36	95	288	2	99
62	37	91	348	77	83
207	17	83	261	47	64
199	46	100	215	75	53
196	27	91	256	29	81
175</					

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
51	3	91	35	77	91
36	63	89	63	28	100
194	14	96	60	5	99
194	12	97	33	78	93
30	40	100	161	57	97
72	49	100	22	70	100
273	39	83	265	5	95
287	42	75	254	50	69
253	22	91	250	40	82
58	29	84	45	52	87
284	17	95	259	53	97
284	28	82	221	15	90
339	31	95	44	40	94
0	0	100	194	56	90
299	23	96	56	19	97
300	31	76	54	52	77
267	21	90	56	45	100
0	0	98	205	58	93
69	28	88	344	58	83
48	14	98	51	52	89
48	30	95	193	21	89
29	66	100	50	34	97
333	31	82	301	35	69
61	45	100	227	48	78
257	24	81	55	28	80
193	62	80	226	61	91
308	22	99	67	10	100
160	45	71	328	29	90
38	36	77	54	19	99
61	30	99	203	30	93
308	24	97	289	40	83
216	28	90	144	27	87
74	44	90	75	86	54
213	31	70	229	33	77
48	5	73	0	0	29
63	16	95	193	45	71
31	37	86	210	52	87
30	38	100	40	92	65
216	12	94	314	12	91
70	17	100	29	37	60
272	28	75	271	43	51
51	15	99	0	0	100
255	4	88	297	52	66
196	44	100	62	43	100
52	38	98	35	42	69
61	17	97	216	67	60
39	69	52	47	39	76
259	23	84	261	30	60
287	23	94	259	42	80
51	45	100	308	63	88
61	19	97	50	55	87
207	24	99	34	56	56
244	22	76	235	6	80
62	15	100	334	91	64
180	9	95	254	48	87
171	17	97	319	85	89
300	25	82	271	70	76
198	65	93	212	38	94
215	54	53	240	40	37
190	31	95	240	1	100
199	40	97	218	13	93
0	0	80	240	33	60
195	8	94	262	19	61
234	4	89	240	40	87
284	32	60	143	20	72
186	11	100	306	23	99
213	4	94	0	0	28
314	54	84	260	1	91
300	18	87	56	25	93
183	13	70	218	57	53
92	21	92	27	86	95
174	34	98	357	55	97
196	19	92	39	57	93
42	61	95	26	65	93
30	52	62	58	13	90
300	21	89	297	43	65
307	23	92	204	55	88
321	42	90	250	32	91
64	12	97	218	59	57
250	32	91	298	15	87
62	39	91	272	62	61
42	64	100	26	44	58
152	39	55	51	27	47
29	38	93	340	57	92
197	40	93	42	64	91
210	5	87	180	27	52
43	13	100	274	30	86
328	15	100	300	56	100
180	2	72	276	49	71
15	30	100	328	29	70
55	30	92	24	71	80
0	0	98	222	8	94
301	33	96	270	67	75
286	34	97	275	41	79
250	26	96	41	52	100
227	9	83	65	26	96
193	42	100	252	50	100

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
54	26	99	32	70	27
55	34	99	331	28	99
184	34	92	56	37	97
57	62	100	199	54	84
57	45	89	187	80	82
160	42	100	181	23	92
85	41	89	296	52	86
204	44	95	245	10	95
47	36	96	334	43	87
56	42	100	307	24	81
57	36	94	35	70	100
195	38	100	359	66	100
240	1	96	258	52	65
0	0	97	30	22	35
53	25	99	215	80	100
187	23	91	50	24	98
288	26	100	239	70	75
178	26	92	165	78	70
55	47	100	356	66	100
51	58	100	158	58	100
43	34	91	326	42	73
284	26	93	226	55	53
51	6	99	321	28	100
210	2	100	198	54	96
43	3	100	19	25	88
200	18	91	250	42	55
228	17	92	311	39	91
176	24	47	64	23	46
180	2	42	208	30	61
11	24	66	163	6	46
291	10	75	308	30	51
277	35	52	259	33	76
234	28	70	191	38	53
54	16	98	266	30	79
316	56	76	307	18	93
29	42	100	86	42	100
281	13	100	219	16	72
193	20	100	57	14	99
36	40	100	307	52	100
52	15	100	249	38	74
297	29	95	185	54	88
168	52	77	60	28	84
180	42	88	29	63	94
53	26	99	342	56	95
272	37	95	189	22	100
303	33	87	85	40	86
72	14	98	196	45	100
288	25	71	85	31	89
184	38	100	245	42	100
302	36	91	278	56	86
52	61	96	13	73	96
77	33	85	38	62	74
168	47	89	297	24	100
268	27	100	62	40	100
56	30	99	23	58	97
96	20	98	318	45	91
58	25	94	108	58	85
77	22	78	73	14	87
272	26	92	62	40	100
206	30	100	244	54	82
300	26	99	190	87	96
70	17	100	194	42	100
244	46	83	40	62	94
67	22	96	43	12	82
320	20	87	54	16	98
60	17	99	39	64	98
41	8	99	49	66	92
43	7	98	49	66	92
40	7	98	49	66	92
268	54	77	81	84	86
355	23	98	352	64	95
249	14	91	272	44	90
41	71	65	67	86	49
320	70	82	285	8	98
179	49	69	163	21	95
29	98	69	175	19	91
265	31	84	37	98	84
45	30	88	195	51	81
63	19	98	353	62	95
200	39	95	48	21	94
156	35	89	162	6	87
210	47	78	0	0	99
40	55	98	20	46	49
297	38	94	278	55	87
178	30	96	0	0	99
196	38	98	260	18	96
16	21	90	354	46	66
152	38	94	22	79	81
190	39	73	315	49	75
257	25	73	309	31	73
52	36	73	21	86	74
188	28	73	272	66	60
43	13	100	274	30	86
328	15	100	300	56	100
180	2	72	276	49	71
15	30	100	328	29	70
55	30	92	24	71	80
0	0	98	222	8	94
301	33	96	270	67	75
286	34	97	275	41	79
250	26	96	41	52	100
227	9	83	65	26	96
193	42	100	252	50	100

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
48	61	96	0	83	65
16	34	95	324	69	71
355	19	97	63	36	100
65	4	98	357	17	97
181	38	98	47	82	95
64	38	100	343	88	91
57	49	97	60	13	99
30	56	87	57	38	95
61	49	98	357	44	35
51	47	100	65	5	100
200	2	99	302	31	96
57	66	97	15	86	93
38	64	90	63	28	100
49	57	97	288	2	99
63	40	100	27	58	57
324	27	93	331	31	88
327	17	97	322	61	71
35	33	91	43	47	47
53	21	85	252	39	75
300	4	97	37	75	93
323					

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
225	16	76	53	39	63
285	32	76	240	0	88
184	34	92	56	37	97
50	52	100	6	19	89
8	20	100	40	54	100
300	20	92	19	69	76
285	38	93	321	60	73
0	0	100	201	61	83
56	42	100	307	24	81
85	41	89	296	52	86
175	10	96	214	72	87
252	34	100	323	30	99
58	12	92	232	47	44
332	16	100	357	36	89
247	31	97	56	27	100
38	49	95	228	18	100
0	0	87	236	14	76
51	58	100	334	37	85
245	33	93	330	26	95
209	66	100	181	65	61
67	19	99	322	46	100
43	37	87	339	28	76
199	8	74	194	6	87
220	36	84	240	16	90
166	45	96	185	22	92
114	16	75	284	40	87
190	39	96	248	33	95
107	7	99	214	44	76
285	18	99	235	60	80
55	47	100	356	66	100
237	35	97	315	89	87

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
36	33	83	187	23	91
299	20	85	329	27	85
45	48	100	302	40	98
34	94	100	180	92	70
358	51	97	22	50	100
58	42	99	184	33	89
123	38	94	335	36	100
305	22	85	268	35	71
186	32	92	128	25	82
358	22	93	260	49	86
285	36	95	321	59	75
329	50	100	55	61	100
59	45	100	35	78	100
299	23	96	56	19	97
160	42	100	181	23	92
82	42	98	354	69	91
199	40	97	218	13	93
174	34	98	357	55	97
62	40	100	37	78	92
284	26	93	226	55	53
200	18	91	250	42	55
259	14	88	207	42	95
0	0	87	285	14	76
87	21	84	187	53	79
132	36	85	203	45	81
187	23	91	50	24	98
188	41	84	273	21	84
50	48	64	270	4	38
319	18	89	246	34	88
216	33	68	216	54	73
194	47	77	205	60	38

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
218	28	72	209	29	40
233	12	89	42	30	87
48	33	91	34	23	42
278	33	89	60	35	91
285	17	93	239	50	76
53	20	82	40	51	45
256	27	94	353	79	75
69	30	100	27	54	100
215	28	93	71	38	100
352	45	97	146	54	85
324	45	96	272	56	78
203	25	86	297	52	93
50	97	99	205	81	91
173	35	97	357	55	96
200	49	82	183	31	88
269	27	89	116	30	89
255	33	84	318	22	100
0	0	87	180	8	83
256	25	100	50	56	95
167	37	86	62	38	100
233	16	88	191	7	96
346	12	100	61	40	94
43	3	100	19	25	88
47	13	96	279	17	81
330	1	89	281	26	61
61	49	98	14	81	93
0	0	98	0	0	98
193	39	78	60	2	80
203	15	85	294	21	74

## Stallion Data:

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
43	41	86	330	78	35
183	19	91	0	0	27
60	12	100	247	39	97
0	0	98	211	53	91
231	9	85	60	2	25
28	39	52	41	18	88
53	11	89	224	36	54
0	0	98	228	59	90
238	17	78	0	0	99
285	36	95	321	59	75
178	23	45	29	84	84
34	63	90	23	56	71
226	58	91	64	48	64
14	14	70	20	5	24
183	8	96	30	91	90
191	19	91	0	0	98
330	2	100	223	75	75
231	9	85	60	2	25
50	20	85	27	19	44
0	0	99	53	55	80
209	59	84	47	100	98
253	45	83	215	62	99
49	21	81	32	40	54
39	50	87	59	22	96
29	40	64	50	36	83
216	37	82	241	46	47
45	29	42	217	21	68
216	34	91	216	59	57
0	0	73	0	0	41
245	27	83	29	22	84
28	41	81	29	80	48
22	58	80	48	30	98
43	33	77	43	17	33
226	8	84	0	0	27
255	4	88	210	80	82
35	56	56	260	4	27
209	52	75	217	88	68
20	59	78	0	0	27
211	15	94	225	45	62
62	18	64	83	51	20
249	17	75	174	13	89
45	20	96	240	6	80
34	60	86	24	46	65
32	36	62	26	40	25
44	24	85	40	60	80
235	6	78	203	60	70
0	0	79	64	38	100
12	59	78	42	42	38
0	0	99	42	45	86
40	39	77	0	0	48
203	21	75	328	72	87
0	0	99	49	23	77
79	15	64	210	30	41
25	40	55	59	23	96
36	44	73	0	0	79
291	67	56	67	58	87
52	30	91	215	35	87

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
41	36	71	42	37	32
43	31	90	1	68	74
46	25	82	0	0	97
18	42	63	0	2	20
44	38	73	24	2	99
214	6	88	330	3	24
32	61	85	46	49	97
30	65	98	24	2	100
176	78	51	242	21	72
198	77	59	200	51	90
57	37	60	100	1	96
37	35	76	37	55	33
27	33	64	50	43	92
48	32	87	39	32	45
50	20	85	34	44	41
42	58	100	22	41	58
30	2	63	23	15	20
191	44	100	219	15	100
35	34	66	14	26	33
185	16	65	180	1	100
29	48	53	52	36	100
215	52	66	16	24	31
226	43	70	224	31	83
172	21	85	233	40	65
145	29	69	67	22	76
338	9	46	352	17	35
41	47	87	217	41	88
41	45	85	0	0	20
255	14	69	242	31	44
45	55	96	22	43	58
204	21	51	215	25	82
31	41	68	45	15	95
45	13	95	0	0	27
8	36	72	7	46	49
46	20	88	48	23	49
0	0	100	0	0	100
39	24	89	24	72	96
27	42	66	260	4	27
0	0	67	270	1	93
42	58	97	329	23	95
44	33	74	42	51	31
180	5	60	189	13	42
90	49	81	41	57	99
77	9	93	90	57	64
202	90	69	35	94	100
54	17	96	29	43	32
53	29	96	214	37	95
52	24	96	35	54	58
61	38	98	2	70	78
40	57	80	5	61	64
40	45	84	0	0	23
47	61	98	109	67	85
46	51	80	0	0	98
6	62	74	90	66	88
205	36	67	357	68	100
38	60	84	0	0	65
209	48	91	210	55	48

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
<tbl\_info cols="6

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
200	25	87	197	60	47
12	27	58	183	9	93
202	58	70	255	5	34
22	67	83	218	47	65
0	0	36	203	51	63
51	21	85	260	1	100
30	48	64	50	26	95
0	0	37	0	0	99
221	54	58	51	65	93
5	68	69	0	0	99
5	69	69	245	34	58
50	52	95	5	69	69
0	0	36	50	53	95
38	45	70	188	37	95
349	50	79	39	12	97
44	52	85	225	46	72
24	22	53	132	2	81
111	8	100	150	81	88
94	6	97	180	71	70
288	8	74	269	57	64
224	4	98	319	59	80
336	3	56	327	84	74
36	3	74	50	32	100
353	46	81	38	13	92
47	14	89	0	0	27
54	8	95	49	19	46
43	57	93	217	49	91
233	8	87	230	45	61
45	13	95	42	42	38
41	14	96	29	71	88
260	2	71	187	81	54
56	30	96	353	72	88
60	16	100	174	81	67
48	74	100	36	100	58
44	70	100	22	99	77
46	48	100	24	100	28
0	0	99	288	40	87
63	15	60	250	44	54
49	53	95	11	64	71
216	36	85	217	61	55
43	45	84	46	50	31
60	18	98	124	57	91
0	0	88	29	91	90
51	11	98	32	23	51
29	38	44	49	49	71
62	23	94	38	25	39
245	24	84	61	38	100
167	18	99	239	35	82
7	30	95	218	39	57
272	20	72	56	37	100
44	38	94	11	58	78
0	0	95	193	44	73
60	20	84	21	13	43
35	45	58	0	0	27
50	50	47	69	10	76
43	42	89	193	86	91
173	83	100	36	53	76
227	24	83	193	7	77
75	21	94	174	82	85
57	19	81	38	41	45
155	36	100	162	5	98
183	24	86	222	5	85
178	14	91	148	62	65
240	19	76	233	25	38
174	93	69	233	7	84
91	31	82	60	1	100
29	46	57	56	34	98
295	29	88	63	26	100
160	31	95	41	57	98
184	52	69	257	39	60
214	36	67	57	31	73
127	21	84	30	6	27
352	40	100	351	50	85
51	46	100	36	83	76
37	66	84	62	29	100
0	0	80	0	0	20
41	20	75	17	66	82
295	21	71	348	23	53
218	5	95	245	11	88
171	37	89	0	0	20
43	59	96	160	50	87
271	37	71	158	54	82
44	38	80	9	65	80
31	64	91	315	61	62
180	56	71	172	15	96
22	67	72	192	23	17
61	49	98	357	45	35
194	40	79	51	58	93
44	48	70	348	62	36
176	18	100	282	35	96
276	19	98	41	69	95
26	67	93	211	81	77
190	47	94	271	53	78
60	54	98	28	89	90
211	29	73	165	10	16
37	64	91	67	28	100
180	56	71	68	28	100

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
199	44	98	242	73	66
41	61	95	348	80	92
245	28	83	50	62	91
166	40	100	180	28	100
60	12	99	220	68	59
79	54	82	330	2	100
45	54	86	186	44	28
180	56	71	68	28	100
83	74	100	290	71	78
250	41	82	340	1	99
81	54	100	27	45	97
24	3	70	212	35	31
43	45	84	330	4	20
43	60	97	194	61	98
45	51	81	22	81	69
200	8	97	195	46	84
31	64	96	18	100	72
299	38	56	222	31	65
41	47	76	264	29	41
79	48	100	23	47	62
180	35	92	210	58	46
5	44	92	310	44	40
240	16	90	162	8	100
39	44	96	300	35	44
51	22	87	29	46	91
151	18	100	0	0	98
200	20	95	212	38	33
66	20	100	353	37	86
0	0	99	173	49	73
274	6	98	352	42	84
356	22	96	288	31	45
33	34	92	148	49	49
19	45	49	212	54	20
233	8	80	221	44	37
56	34	96	32	52	75
242	16	75	0	0	99
0	0	31	186	68	97
41	53	94	205	41	71
38	58	65	33	46	31
52	60	88	285	42	69
262	49	47	49	41	93
41	22	67	234	37	40
189	15	93	25	47	89
212	26	54	212	92	35
206	49	77	51	98	96
28	69	93	338	62	59
207	35	79	152	7	100
51	8	99	36	55	43
209	36	71	231	50	43
32	55	90	325	50	69
176	45	59	88	47	76
152	17	86	183	46	53
0	0	98	0	0	98
214	51	74	223	69	41
0	0	95	0	0	17
215	47	87	217	25	94
56	18	99	0	0	100
0	0	92	229	5	82
180	29	57	180	1	65
39	37	77	34	12	23
0	2	100	201	56	87
0	0	57	223	67	49
178	32	94	65	30	99
83	51	89	29	46	49
35	52	60	50	35	91
47	62	96	25	72	93
242	19	75	62	31	95
0	0	34	180	23	85
238	36	100	47	30	93
300	1	100	214	62	81
208	40	100	52	42	100
174	93	69	233	7	84
27	44	51	47	57	85
240	19	76	55	34	94
62	40	100	233	12	85
36	33	87	349	20	33
201	29	96	48	53	98
33	4	100	28	76	100
204	12	100	230	46	47
0	0	98	228	59	90
185	56	76	243	56	73
30	43	71	312	17	12
40	35	71	58	12	92
0	0	33	188	41	93
47	34	98	225	58	82
31	41	43	38	15	89
211	60	78	208	6	97
37	55	90	27	48	53
0	0	60	0	1	29
0	0	99	42	64	82
44	30	73	40	53	33
226	36	79	229	58	51
214	4	65	0	0	90
200	38	96	73	15	47
53	20	82	40	51	45
0	0	99	28	37	39
0	0	80	245	34	58

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
265	17	96	0	0	37
211	69	36	211	51	81
61	20	100	359	73	80
0	0	92	0	0	28
216	37	82	241	46	47
22	61	78	49	32	93
41	36	71	42	37	32
226	8	84	0	0	27
45	55	96	22	43	58
37	35	76	37	55	33
30	65	98	24	2	100
233	8	85	300	2	20
62	12	93	59	22	92
213	24	100	211	64	50
210	29	43	232	98	17
237	25	100	359	66	100
200	49	89	210	12	88
312	2	82	215	16	87
237	12	67	0	5	24
329	50	100	215	80	52
269	31	71	180	1	82
60	20	100	353	79	75
0	0	85	205	20	51
245	24	84	50	51	87
22	58	82	48	30	98
0	0	60	184	26	99
209	59	84	47	100	98
34	63	90	23	56	71
52	30	86	215	42	85

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
245	27	83	29	22	84
151	31	69	226	32	37
46	22	83	35	17	45
180	20	85	252	7	28
194	19	89	210	63	45

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
186	26	83	0	0	58
112	31	71	44	53	91
49	19	92	43	25	39
211	24	75	213	25	38
245	11	82	30	48	64

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
196	25	99	211	62	96
37	54	52	219	24	92
76	28	77	68	10	97
86	18	91	340	44	37
41	46	88	143	57	63

## APPENDIX B: 200 GENERATED PONY COLORS

### Mares

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
68	23	84	310	41	83
1	4	81	217	28	97
311	49	98	264	67	88
64	59	84	288	35	83
258	24	95	330	6	74
279	5	97	63	59	51
37	14	82	85	34	91
180	25	93	225	44	38
61	45	51	326	16	58
0	28	87	280	59	62
188	70	77	42	93	96
359	43	63	25	36	93
52	6	93	2	29	37
174	27	94	25	50	36
256	30	91	258	39	92
61	18	83	190	17	86
299	39	93	323	40	74
58	16	90	260	1	53
51	47	98	351	50	87
226	6	72	357	47	98
56	3	97	185	27	83
49	31	86	345	28	44
70	26	95	207	39	67
333	18	90	255	42	98
251	21	89	254	68	71
53	34	98	318	42	91
259	19	98	61	45	83
48	49	87	32	67	97
214	26	89	20	62	94
59	65	96	228	68	85
36	22	87	221	83	92
245	40	99	310	16	86
55	14	89	217	69	75
254	39	86	214	55	77

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
66	37	87	329	48	98
257	18	94	181	16	95
352	35	71	275	37	99
19	30	92	218	51	88
17	27	96	222	29	95
327	52	97	45	36	49
178	29	71	308	59	83
1	41	69	261	34	99
123	21	61	35	8	87
308	21	56	68	37	63
214	4	91	211	65	96
62	64	97	324	44	85
185	41	73	85	10	46
44	27	87	168	36	87
360	8	93	247	58	97
191	19	90	265	87	27
35	62	93	55	83	97
161	20	53	45	49	98
310	63	87	249	80	93
1	47	95	30	57	71
59	25	93	56	63	49
30	35	93	200	26	77
66	24	93	255	28	94
122	49	91	218	76	62
201	48	98	201	39	90
159	41	98	62	44	76
43	29	97	31	57	94
259	40	91	51	63	93
197	36	81	189	52	65
32	2	65	200	65	87
189	21	95	50	84	53
341	21	99	36	42	95
57	20	78	55	70	90
298	50	71	180	30	90

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
211	38	48	167	54	74
199	1	78	54	25	73
30	13	94	30	25	97
193	8	94	262	68	91
322	25	93	302	44	60
171	90	97	207	68	97
207	47	87	34	43	60
174	11	92	252	25	31
49	19	90	325	43	84
227	71	79	230	55	90
282	9	85	56	86	97
60	63	96	60	41	89
187	18	63	54	67	87
53	36	92	69	48	63
245	41	61	209	57	96
10	48	96	189	32	58
44	25	93	330	71	79
60	27	96	39	59	64
52	24	72	53	40	89
318	31	94	321	36	66
114	25	90	339	62	43
191	26	98	330	41	86
222	53	97	18	73	82
184	31	97	216	63	95
92	22	90	2	33	35
52	41	55	280	67	82
264	56	92	56	65	91
195	5	97	276	46	37
323	13	84	136	70	96
248	13	98	56	27	89
219	45	96	25	26	84
193	36	98	33	59	29

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
44	21	74	235	31	65
1	3	70	163	16	98
251	58	95	214	61	77
42	62	74	223	23	65
209	25	87	288	1	50
216	2	97	39	52	28
0	7	70	43	23	86
55	25	90	183	36	20
42	51	33	260	0	31
1	32	80	222	54	35
62	76	62	24	96	90
356	50	50	2	22	95
31	1	88	2	13	20
53	28	92	2	44	19
209	32	87	212	28	83
43	15	71	58	2	73
236	49	90	245	33	50
39	13	75	213	1	28
31	53	97	339	42	83
187	1	57	351	42	99
34	2	94	51	9	70
28	33	75	333	15	23
46	27	90	102	27	39
294	15	87	210	38	95
210	19	78	210	64	44
34	37	98	240	35	87
211	18	98	37	37	65
26	58	78	0	62	99
181	22	81	1	60	91
37	68	92	180	61	75
1	18	78	183	83	84
200	45	97	235	1	70
38	5	81	166	64	51
208	50	75	151	53	56
44	42	69	285	40	97

Coat Hue	Coat Saturation	Coat Value	Mane Hue	Mane Saturation	Mane Value
209	16	87	51	2	92
349	37	56	218	32	94
1	38	85	176	45	75
2	24	91	176	17	92
279	58	99	27	27	27
51	27	56	233	53	71
1	50	54	210	24	97
50	20	43	10	1	79
248	19	38	41	31	36
181	3	85	148	59	93
41	67	97	249	35	76
59	46	58	43	1	25
20	21	73	50	24	83
357	3	91	205	53	98
63	15	82	213	87	15
3	65	86	33	84	97
54	16	35	24	43	95
250	66	77	207	80	95
0	53	90	1	46	44
40	25	93	35	56	29
2	42	81	65	14	53
42	26	89	212	16	90
48	59	83	174	73	35
165	54	96	68	27	82
54	45	96	38	37	55
27	30	95	1	46	91
211	47	86	32	59	83
86	40	69	57	48	40
2	1	48	66	59	75
61	17	90	29	80	29
338	22	98	12	33	91
35	18	66	35	68	88
238	58	56	53	18	87
178	39	33	49	48	50
151	2	69	27		