

# ON HEARTBREAK

CH0NDAWG

## 1. INTRODUCTION

Heartbreak... a miserable, miserable thing. One of the long-standing questions of many scientists in love is: *How do you quantify love? And the heartbreak that's supposed to come with it?* Of course many would scream loudly at this point that many aspects of the human experience should never be disgraced by assigning a number to it, for it would condemn human qualities to analysis by that cold, hard, soulless subject known as mathematics. Who would think of doing something so wretched?

Me, of course. Mathematics is neither soulless, nor does assigning numbers to things or measuring things necessarily dehumanize them. Instead mathematics should be part of the human experience. Anyway enough “mathematical moralizing.” Here we describe a way to quantify heartbreak. (Remember, students, that this is *only a theory*, and hence you are encouraged to approach this subject with an open mind...)

We define the standard unit of heartbreak, the **harmony** (symbol Hm) to be the amount of heartbreak dealt to me by Harmony. All the standard prefixes apply. For example, Harmony dealt me 1 harmony = 1000 milliharmonies =  $10^6$  microharmonies of heartbreak.

Small units of heartbreak (milli-, micro-, nano-, and so forth) are useful for dealing with ordinary offenses such as insults, getting cut off in traffic, getting dirty looks, and so forth. For example, some random girl gave me the finger the other day for turning from the wrong lane. That constitutes perhaps 1 nanoharmony of heartbreak.

## 2. STENDHAL'S LAW AND SENSITIVITY

As it stands the unit of heartbreak is virtually useless to the casual reader. Few would know who Harmony even is. Thus, as it stands, one would have no idea how to actually measure heartbreak on their own terms. However an important result in the theory of heartbreak, which alleviates this difficulty, is **Stendhal's Law**:

**Theorem 2.1.** *For ideal, linear, and monotropic lovers (such lovers are called quixotic), the amount of time to get over a heartbreak is directly proportional to the amount of heartbreak dealt. Quantitatively, we can write this as:*

$$(1) \quad T = 4\pi sH$$

where  $T$  is the time to get over the heartbreak,  $H$  is the amount of heartbreak dealt, and  $s$  is a constant of proportionality called the coefficient of sensitivity, and the  $4\pi$  is there solely for the purpose of making the formula have a  $\pi$  in it.

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The coefficient  $s$  is characteristic to the lover. Why is  $s$  called the sensitivity? It is roughly because more sensitive individuals take longer to get over heartbreaks, i.e. for fixed  $H$ , a large  $s$  means a larger  $T$ .<sup>1</sup> A common stereotype is, then, men have small  $s$ , while  $s$  is relatively large for women.

Now this defines a natural standard unit of sensitivity: the **ch0ndawg**. 1 ch0ndawg is defined to be the amount of sensitivity that makes 1 harmony of heartbreak correspond to 4 months of time, i.e. the time it took me to get over Harmony. It therefore follows that 1 ch0ndawg =  $(1/\pi)$  month/harmony. This is still not quite useful for the reader, however. This is because the collection of three units, (harmony, ch0ndawg, month) form a type of coordinate system of heartbreak called an **egocentric** coordinate system. Perhaps a more useful coordinate system could be based on, say, national surveys or averages. Indeed, one of the most useful coordinate systems is based on the notion of “coolness.” That is we could establish standard units for the average person considered to be “cool” since, well, people like to be cool. This unit system is called the **kewliocentric** coordinate system.

### 3. EXPLANATION OF THE TERMS

We have not explained the terms *ideal*, *linear*, and *monotropic*. Let us treat each of these conditions in turn, and point out their flaws. *Ideal* means, just that, ideal, which means the heartbreak dynamics of any real lover cannot be described perfectly via Stendhal’s Law. *Linear* means that the law is a proportion in the first place, i.e.  $s$  is not an explicit function of  $H$  (one’s sensitivity is not affected by the heartbreak one receives). Finally, *monotropic* means that the lover only obsesses over one person (henceforth referred to as a *victim*) at a time.

We can swiftly take care of the issue of ideality by saying that in most cases, possibly with the modifications we will later mention in conjunction with the other terms, Stendhal’s law is a very good approximation.

A deviation from monotropicity, i.e. lovers with multiple victims (*polytropic* lovers), is easily treated. Lovers who treat their victims equitably can still be considered monotropic but we must make  $H$  a vector quantity and the equation is now just involving a scalar multiplication. More usually the case, polytropic lovers treat each victim differently, and moreover love of one victim may have some influence on the others (i.e. the victims are not independent of one another). In this type of scenario, a variant of Stendhal’s Law still holds (still assuming linearity). The situation here is more complex and we shall, for the rest of this discussion, only consider monotropic lovers (without loss of too much generality).<sup>2</sup>

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<sup>1</sup>In strongly curved spacetime, the so-called “constant”  $4\pi$  can vary. Not the  $\pi$ , of course, but rather an expression involving the Riemann curvature tensor. The formula is quite ugly. One can think of this in terms of the following example: in the vicinity of a black hole, one’s heart can be assumed to be literally breaking from holding up against strong tidal gravitational forces (i.e. dealing with the large curvature of spacetime), so of course it would result in a larger coefficient. Since gravity and hence spacetime curvature in the neighborhood of our solar system is relatively weak, we can safely ignore this aspect.

<sup>2</sup>The variant of Stendhal’s Law which holds for polytropic lovers is given by simply considering  $s$  to be a rank-2 tensor called the *sensitivity tensor* of the lover. For lovers who become more aggressive as their victims protest, this tensor is rank-2 contravariant, and lovers who back off from such protests have a rank-2 covariant sensitivity tensor. Finally the lover that persists unchangingly has a sensitivity tensor of mixed variance. So the law would be

$$T^j = s_i^j H^i$$

Now for the linearity itself. In real lovers, of course, sensitivity is affected by heartbreak—individuals become bitter, cynical, etc. Severe effects of course are hopefully temporary. . . at least within a certain “linearity regime” of heartbreak. However time evolution does introduce permanent changes, not necessarily due to the various negative things listed above—it could be something as simple as becoming more mature and more adept at handling situations such as heartbreak. Nevertheless it is useful to fix a period in one’s life as a universal basis to judge and compare heartbreaks, if for nothing other than historical interest. For the egocentric (harmony, ch0ndawg, month) system the standard is the **Epoch C1999.08 Egocentric** system, which refers to the date in which the unit of harmony was established.<sup>3</sup>

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<sup>3</sup>A tacit assumption, aside from the three mentioned, is that all our lovers are in fact *sexually orientable*. It is important to be able to formulate the theory without this assumption because, in fact, non-sexually orientable lovers do exist, e.g. bisexuals. It is rumored that someone who had an enormous crush on the mathematician August Ferdinand Möbius in fact was non-sexually orientable. Stendhal’s Law still holds, with appropriate modifications, for nonorientable lovers, but theory is made more complicated because we must consider pseudo-quantities—quantities that have an extra sign-reversal under coordinate inversions (the main culprit in the formulation of the various laws involves the devakian/michellian \* operator). However since most computations take place in one coordinate chart, I shall, like most physicists and mathematicians when dealing with pseudo-quantities, happily sweep this issue under the rug.