

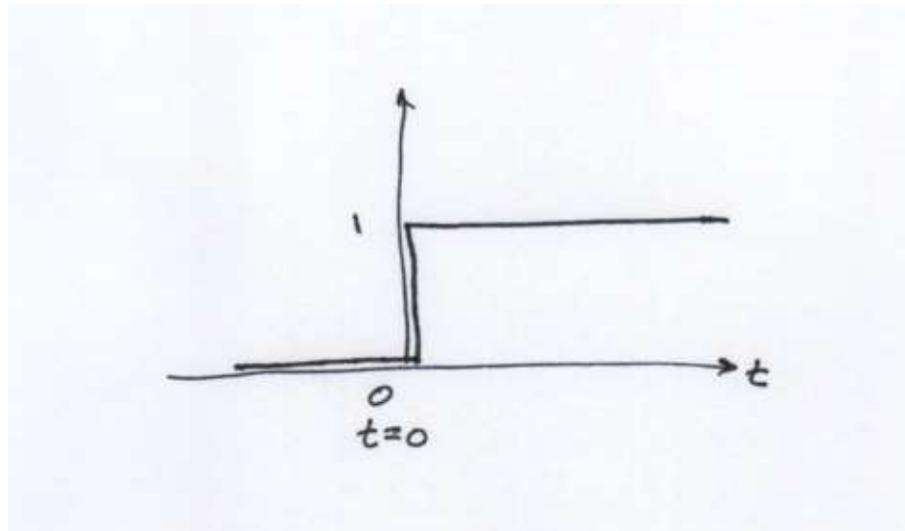
## 10A ENGINEERING THEOLOGY

Many theological concepts might be explained in engineering terms. Engineers typically speak of the input/output of a system, the amplification of signals, forces that shape matter, feedback, tradeoffs, navigation (guidance), and conservation laws. Sin is often linked to decay, corrosion, disease, infection, entropy, and disorder. Following are some examples of what we might call “engineering theology”:

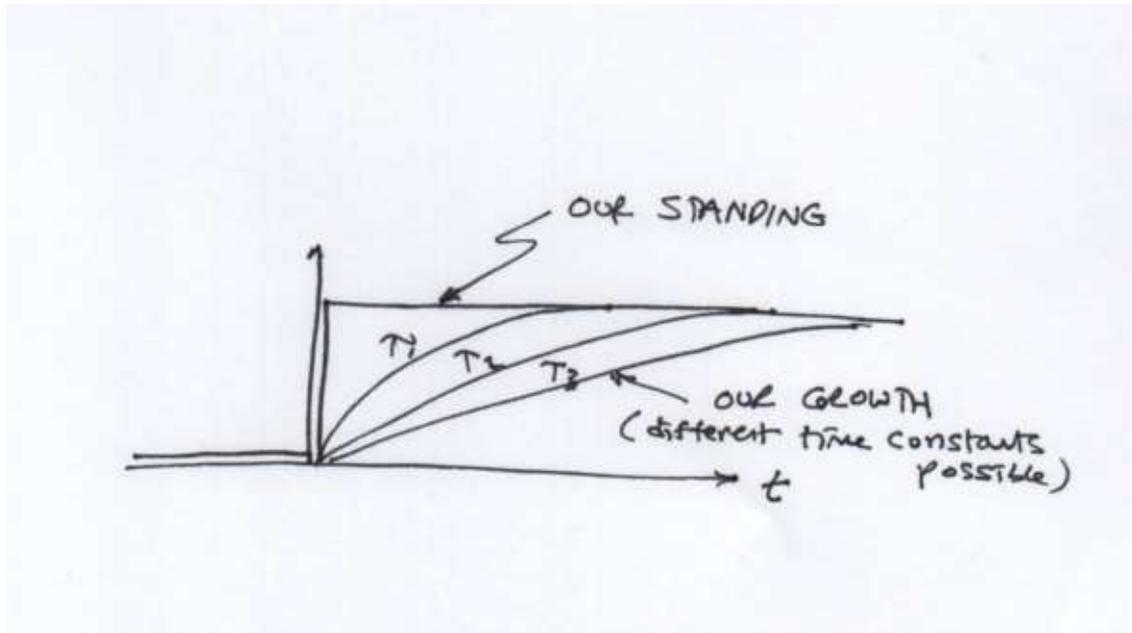
### The spiritual step function

(by Bill)

In control theory and in signal theory we make use of a step function, an instantaneous rise from zero to one at  $t=0$ . When you become a Christian your standing with God is a step function change (justification) as you are taken out of the kingdom of darkness and into God’s kingdom of light.

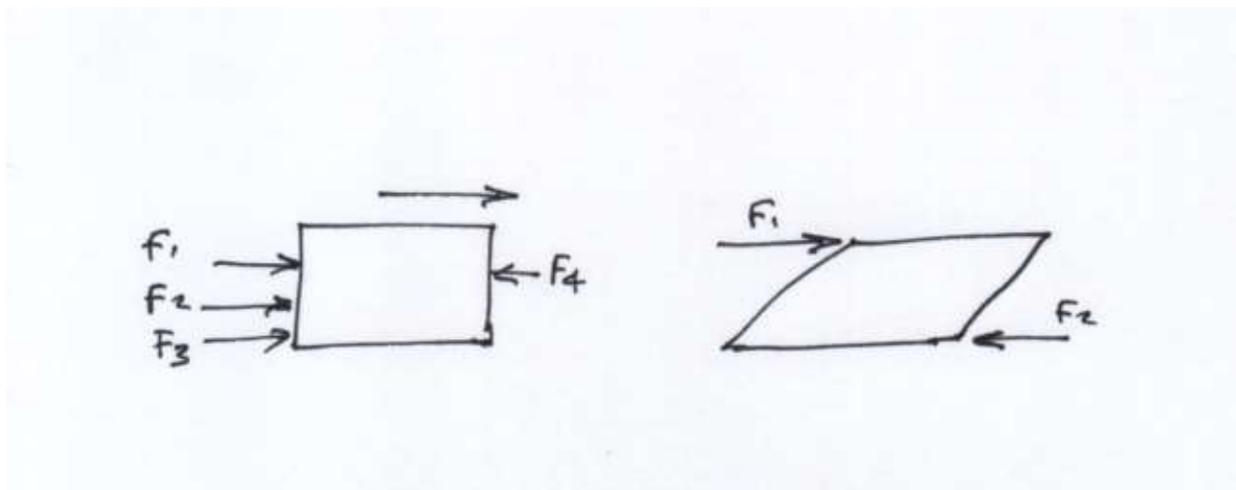


Your spiritual growth, on the other hand, looks like the first-order response to a step function. It is not instantaneous, but increases over time with a certain time constant (sanctification).



### Forces on the Christian Life

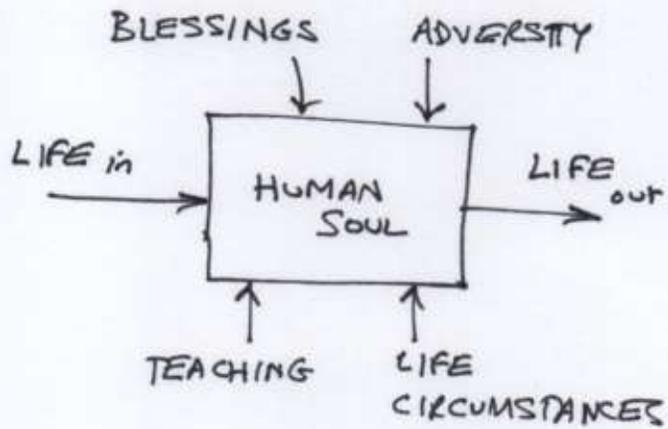
Forces either deform or impart motion to solid bodies.



What kinds of forces impinge on the Christian life?

- External circumstances (difficulties)
- Public opinion
- Peer-pressure
- Finances

We are shaped by all of the inputs to our lives.

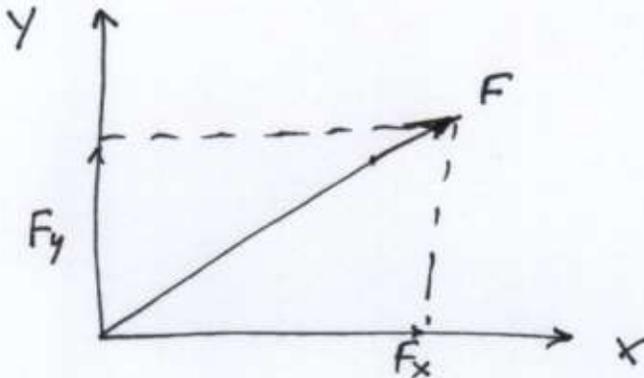


What we need is both endurance and the power/presence of God. God, in fact, often stacks the deck against Himself and then wins the game at the end (The Exodus, Esther, the cross).

### Vector Components

(by Bill)

In Statics we often speak of resolving a vector into components in the x and y (and possibly, z) directions:



When force  $F$  is a vector in the  $x$ - $y$  plane it consists of a component  $F_x$  in the  $x$ -direction and a component  $F_y$  in the  $y$ -direction.

Only when the vector is purely in the  $y$  direction does it fail to have any component along the  $x$ -axis (or  $z$ -axis, in 3-dimensions).

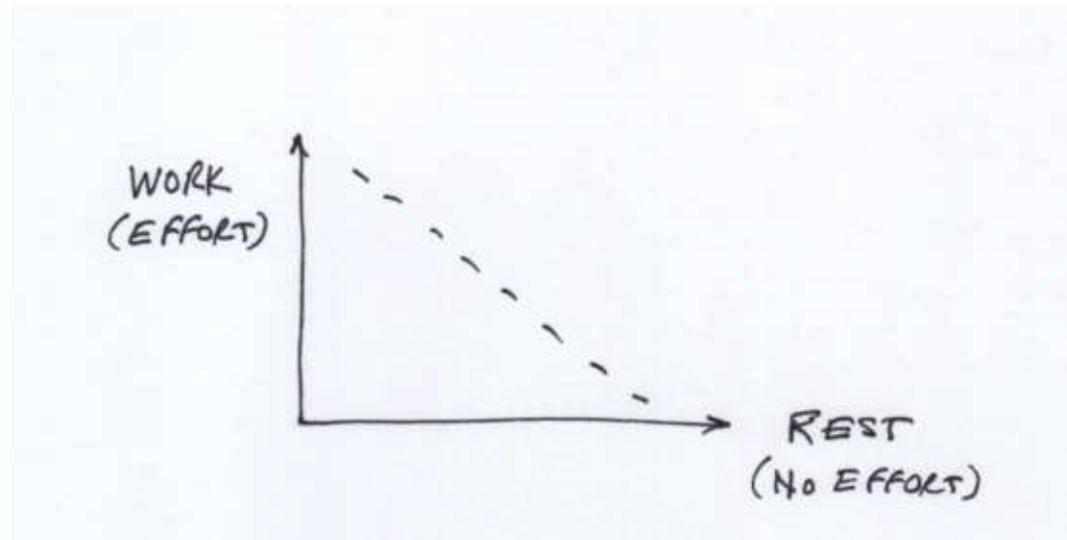
Similarly, we need to realize that not every decision is spiritual, but every decision has a spiritual component, a portion in the  $S$  direction. It may be related to

- Our self-sense (pride or humility?)
- Our attitude (reluctant or joyful?)
- Our motivation (for me-or for God's glory?)
- Our ability (relying on our strength or God's strength)

### Work-Laziness Curve

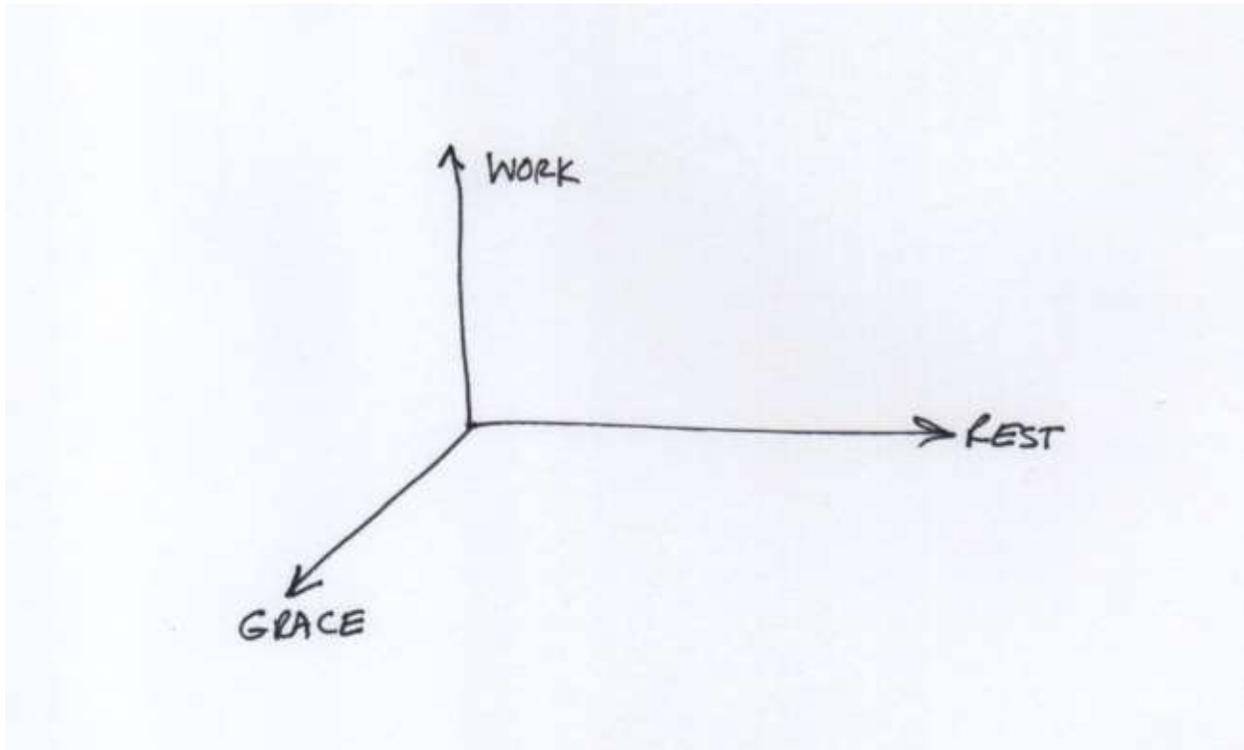
(by Bill)

How do we serve God? We typically think of either work or rest (often translated as laziness). Laziness is wrong if we just veg out and don't get our work done. But work can also be wrong if we do it all the time and in our own strength.



However, for the believer, there is an additional dimension: Grace.

By the leading and empowering of God's Spirit, it is possible to accomplish a great deal with only a modest human effort. It is possible to work and rest at the same time if the Lord helps us to work.



The result is three kinds of people:

- The double-minded person: Lazy –doesn't want to exert any effort
- The carnal person: Humanistic: "I can do it myself"
- The spiritual person: Lives by grace

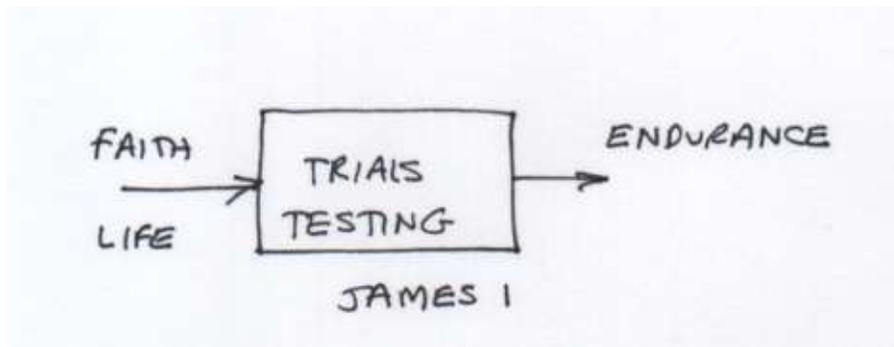
## Testing

Components and materials are tested all the time. Testing may include:

- Testing against requirements
- NDE- non-destructive evaluation
- Lifecycle testing
- Testing to failure-destructive testing

One idea that arises several times in Scripture is that God tests His people.

James 1:3 says "The testing of your faith works patience (endurance)."



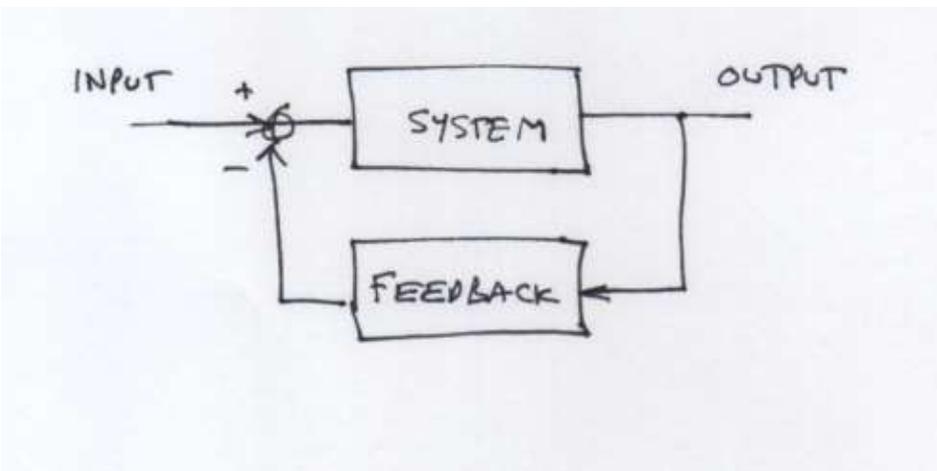
The testing here isn't a multiple choice test to see if we know the answer. It's more like the testing done near the end of a project to see if it meets the original specifications and if it's serviceable under extreme conditions. A box of electronics may be dropped from several feet, shaken, subjected to high voltage or temperature extremes.

*Why put this piece of hardware through such brutal conditions? Because they want to prove this is reliable hardware capable of withstanding certain types of operating conditions. Likewise, in the software department, we try to test whatever sort of conditions might make the software break... So what is more interesting to test? Boundary conditions--things on the extreme ends of what is possible. What happens if you pass in a null or 0 value? What happens if you pass in an integer that is the maximum possible value allowed by the data type? What happens if you pass in a negative value? ... When God puts you through it, think of it as God "debugging" your faith.*  
[1]

## **Feedback**

(by Bill)

Some basic concepts, fundamental to those of an engineering discipline, can be applied to everyday life. For example, a person concerned about his or her weight can use the concept that "measurement precedes control." This concept comes from the engineering principle of a feedback loop.



If the output of a system is used to control the input, the whole system may become stable or unstable. Feedback also occurs when a microphone is placed too close to a speaker at a rock concert. The loud noise produced is due to the instability of too much positive feedback. To control weight, a person may simply count calories daily and record the calorie count on a graph. The individual could also maintain a daily weight record on the same graph. A relationship should arise between these two graphs, and the intake can be adjusted appropriately. Similar thinking occurs in blood sugar control. The individual acts as the feedback loop. Other examples from engineering might include everyday tradeoffs (as in speed/power), “bandwidth”, “signal” and “noise” in communication, personal multiplexing (multitasking), opposing forces in society, and reaching “steady state” activity after wild oscillations.

An easy way to visualize feedback control comes from the phenomenon of greasy eggs.

As a college student I worked briefly as a short-order cook in a campus dorm. This type of situation occurred several times.

A few students would arrive early and order eggs, and I was able to fry up some good-looking, good-tasting eggs. If the students showed their friends and the lines started backing up, the head cook would tell us to make ‘em faster. Don’t drain off all the grease-just keep up with the demand. After a while the eggs coming off the griddle were so greasy that no one wanted them. Then we slowed back to a few customers and nice-looking eggs again.

Feedback is a key element in engineering systems, primarily giving us a correction as it adds to input.

What does feedback look like in the Christian life? Feedback can include: Scripture, conscience, the Holy Spirit, past experiences and lessons, encouragement from others, warnings from others, and circumstances.

1. The Holy Spirit convicts us or gives us peace. (John 16:8, Phil. 4:7)

2. Ideally, the Body of Christ interacts with us to let us know whether we're heading in the right direction or need a course correction. We seldom see it practiced, but there is a place for church discipline when we get into sinful patterns. (Mt. 18:15-17, I Cor. 5:13)
3. The Scripture does mention the idea of discipline by God when we need it. We are to receive it as from a loving Father. (Heb. 12:3-11)

## **Conservation of crud**

(by Bill)

Engineers talk about the conservation of mass, energy, and charge as built in to the universe. What about sorrow, suffering, and sin?

There's a principle I call the conservation of crud. That is, if you sin (you deliberately do something wrong) crud happens. To whom the crud happens can vary. The crud might happen to yourself. You might go out and get drunk, drive your car, run into a telephone pole, ruin your car, and maybe ruin yourself a little bit. In that case, you sin and the crud falls right on your own head. That happens a lot. Sometimes, you sin and the crud falls on somebody else or in some other place. There's a conservation of crud in the universe. Sin causes crud. You might go out and get drunk, drive your car, and run into somebody else and kill them. It's not their fault, and it would just be an innocent person killed. Satan uses sin. In fact, he especially uses sin among Christians. He likes to amplify that sin. I think he sits on your shoulder with a megaphone and catches you in sin and announces it to the whole world somehow. People find out about sin. Non-Christians can get away with things; Christians can't. This has a lot to do with significance.

God has arranged it so that the total amount of sin in the universe is fully dealt with. Either we pay for our own sin for eternity or Christ has paid for all our sin in history on the cross. If we consider that a present act of sin might cause increasing suffering for Christ in the past we might be less inclined to pursue it.

## **Control System Model of a Human**

(Don Knoop)

How might we model a person? What would the inputs and outputs of the system look like? Don Knoop has suggested the following: [2]

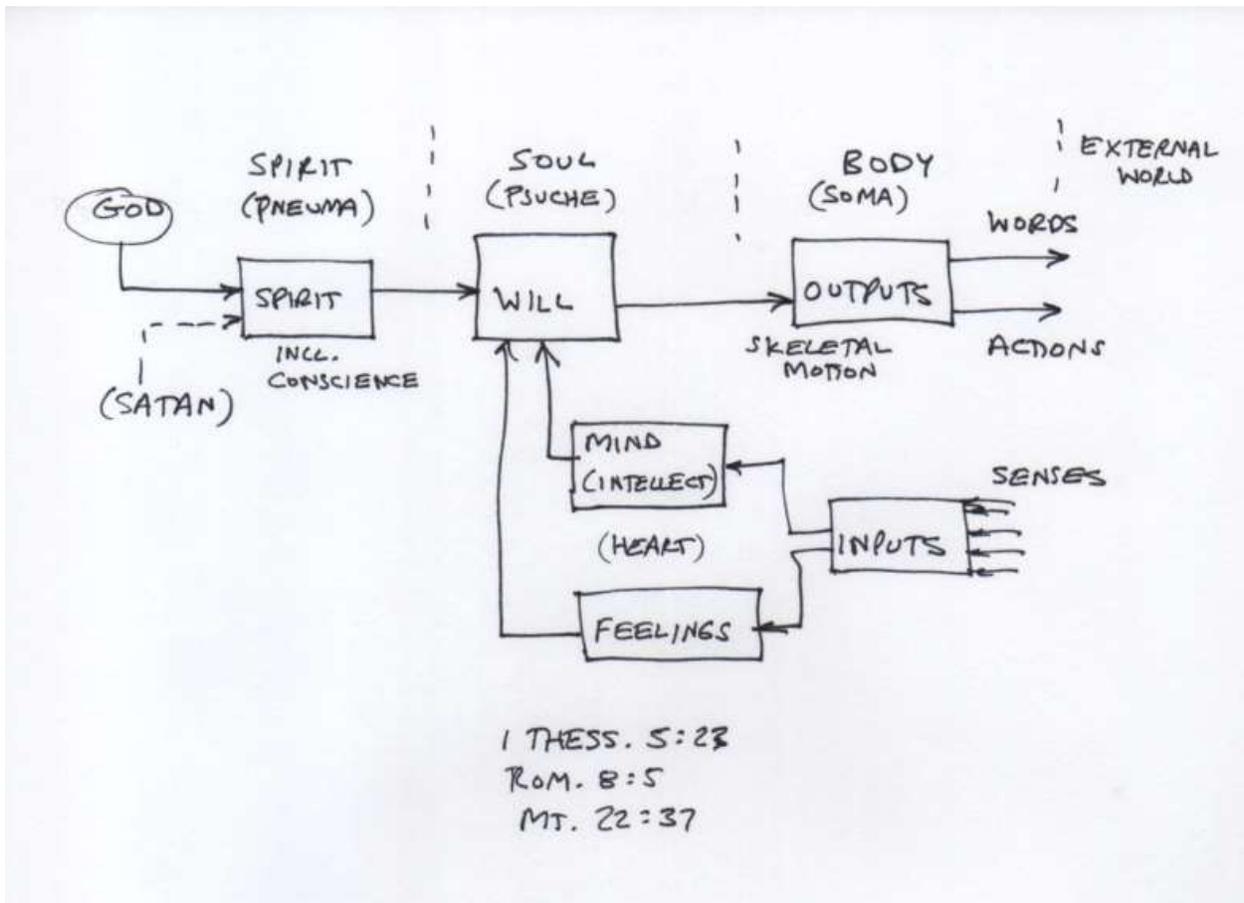
Scripture speaks of body, soul, and spirit (1 Thess. 5:23).

The body interacts with the external world, via sensory input.

Both mind and emotions have input to our will.

The spirit interacts with God (once made alive by Christ).

Satan can tempt believers and nonbelievers.



### If-Then-Else

A major programming construct is the IF-THEN-ELSE structure (If condition A is met, then B will result; otherwise, C will result). We can see samples of this in Scripture:

IF you love Me

THEN keep My commandments;

ELSE (the conclusion would be that you don't love Me.) (John 14:15)

IF you keep My commandments

THEN you will abide in My love;

ELSE (you will not abide.) (John 15:10)

IF you live by the flesh

THEN you must die;

ELSE Put to death the deeds of the flesh and live. (Rom. 8:13)

IF the Holy Spirit dwells in you

THEN He will give life to your mortal body;

ELSE (you will not have life.) (Rom.8:11)

IF God is for us

THEN (no one) can be against us;

ELSE (we cannot stand.) (Rom 8:31)

IF you confess with your mouth that Jesus is Lord and believe in your heart that God raised Him from the dead

THEN you will be saved;

ELSE (you will be lost.) (Rom. 10:9)

IF we say we have not sinned

THEN we make Him a liar and His word is not in us;

ELSE (we confess that we've sinned.) (I John 1:10)

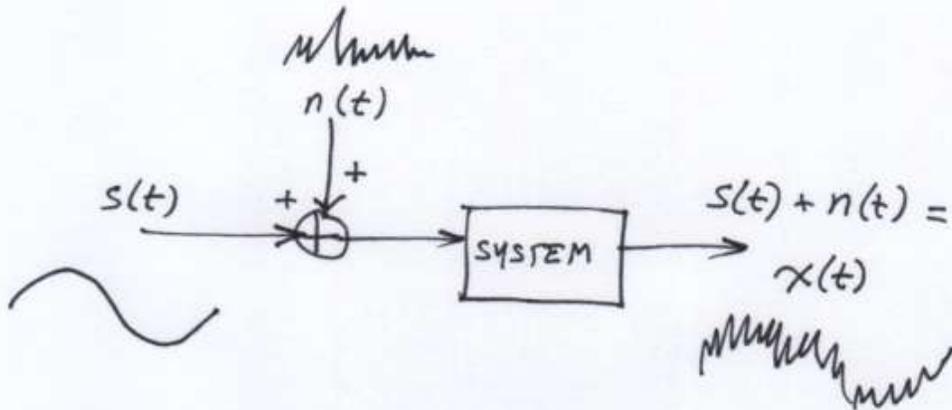
## **Bible Manuscripts and Signal Theory**

(by Paul)

One of the facts about the Bible which points to its validity is the existence of a huge number of Greek manuscripts of the New Testament, approximately (2 thousand), some complete and some only fragments. The only difficulty with the multiple manuscripts is that they don't all agree. If we bought into Bart Ehrman's argument, the New Testament is so badly corrupted that we simply can't trust the wording at all. [3]

Is there a way to recover the original text, what wording was first written under God's inspiration? Here a few insights from signal and communication theory may be helpful.

We often deal with an original transmitted message, considered a pure or perfect signal, which is sent to a system to which random noise  $n(t)$  is added.



$$X(t) = s(t) + n(t)$$

The received signal  $X(t)$  is then the sum of the original signal plus random noise.

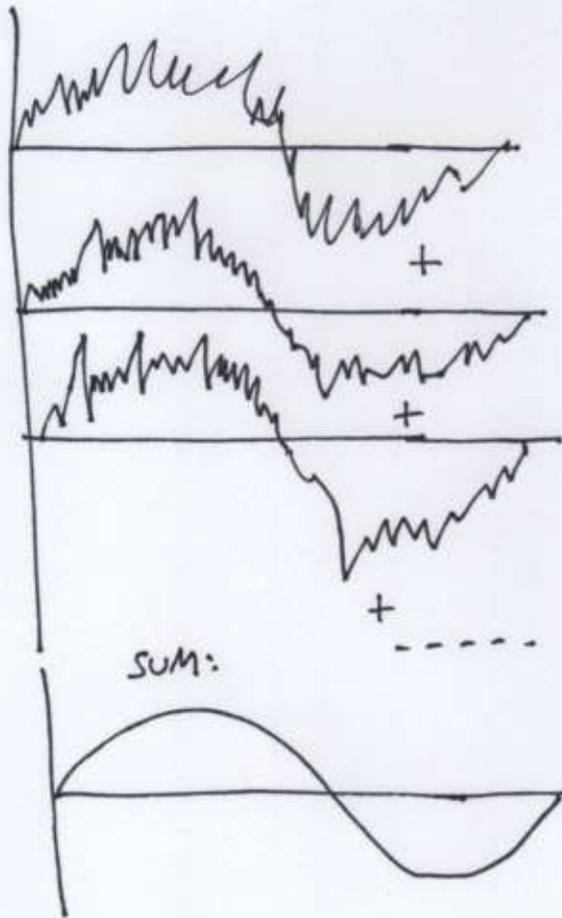
If  $s(t)$  represents the given words, where does the noise enter the manuscript?

God communicated perfectly to the Bible authors, who then expressed the message in their unique styles, all under the guidance/inspiration of the Holy Spirit. The original manuscripts were inerrant.

Every human link in the chain is a potential source of non-deliberate distortion. Human copyists of the New Testament did not have the training of the Hebrew scribes, and small differences crept into the documents as they were copied.

The happy news is that these divergences are minor. In comparing the documents scholars have found that most textual differences involve word order, spelling, grammar, and numbers. Only a few words are uncertain. None of the words actually affect doctrine or instruction. [4]

One technique used in signal recovery is known as signal averaging, a summing together from the same starting point of all the digitized samples from multiple recordings. If the noise is small, random, and zero-centered,  $s(t)$  can be largely recovered. The result is that random signal inclusions average out to zero while the actual (intended) signal is enhanced.



Similarly, when a large number of manuscripts (of the same form and time frame) are overlaid it should be possible to approximate very closely the original message. Can we trust that we have the message God intended? Yes, we can have confidence that what we need to know has been preserved.

*(T)he more often you have copies that agree with each other, especially if they emerge from different geographical areas, the more you can cross-check them to figure out what the original document was like. The only way they'd agree would be where they went back genealogically in a family tree that represents the descent of the manuscripts. [5]*

### **Tyranny of the Urgent**

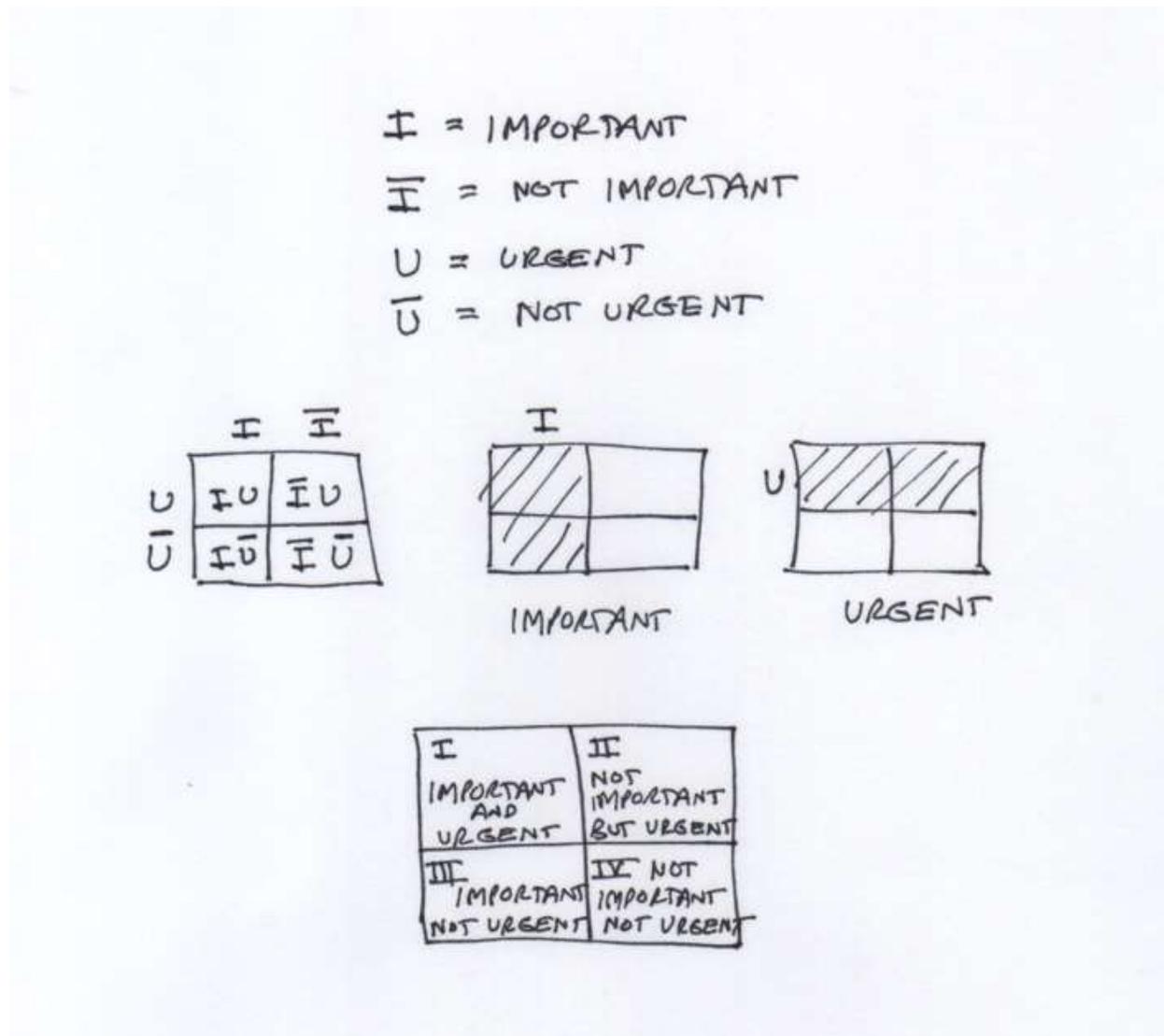
Charles Hummel, former president of Barrington College, authored in 1967 a short essay on time management/goal setting for Christians entitled "The Tyranny of the Urgent" [6] in which he distinguished between "urgent" activities and "important" activities. Hummel suggested that that

the urgent often crowds out the important. David Jeremiah suggests that “we live in an age of urgency addiction. Life is exhausting, but not exhilarating.” [7]

Jeremiah, Four Questions for the New Year, Turning Point radio broadcast, Jan. 14, 2018

*We live in constant tension between the urgent and the important. The problem is that the important task rarely must be done today, or even this week. Extra hours of prayer and Bible study, a visit with that non-Christian friend, careful study of an important book: these projects can wait. But the urgent tasks call for instant action. Endless demands pressure every hour and day...with a sense of loss we recall the important tasks pushed aside. We realize we've become slaves to the tyranny of the urgent.* [8]

Using the notations of digital logic we might arrange Hummel's category possibilities in this way ( a four-cell Karnaugh map):



Quadrant I is crisis activities, which we must handle immediately (put out the fire, stop the flooding, call an ambulance)

Quadrant II is items that have a definite due date or time stamp, but otherwise don't impact the rest of our lives (bills are due, taxes are due, vehicles need registration).

Quadrant III contains important matters, but they're not screaming at us (daily Quiet Time/devo, time with friends, calling family members). These often get neglected.

Quadrant IV items can be done anytime (play video games, surf the web, rearrange the sock drawer). They have a place in life, but they don't drive our schedules. Somehow we usually find time to do them.

Suggestions:

- Prayerfully seek God's instructions every day
- Prioritize activities
- Schedule specific time for the most important activities

## **Measurements and the Bible**

John Tixier [9] has presented a detailed study of units and measurements used in the Bible.

*To measure something is to determine a certain set of its properties in reference to a standard. At its simplest, it is a form of counting. Properties can include (but are not limited to) size, weight, duration, quality, or merely amount. Measurements are so important to our daily life that we often communicate in measurement terms without thinking about it. One does not have to be an engineer to measure the height and weight of a child and record it on a growth chart for future reference, or to track the fuel efficiency of a car in miles per gallon upon filling up at the pump. When a package is mailed, or a bag checked at the airport, one is cognizant of the necessity of measuring the weight of the item.*

Tixier notes these lessons about measurements:

The Bible speaks of specific measures of time, space, distance, weight, money, and volume.

God expects accurate measurements.

God expects honest measurements.

God "measured out" Creation. (Isa. 40:12)

God's judgments occasionally involve measurements (You have been weighed in the scales and found wanting- Daniel 5:26-28)

Particularly interesting are "spiritual measurements":

*Special notice should be taken when God gives someone a measuring assignment (e.g., Rev 21). But even more interesting may be the intangible matters related to Christian living that give*

*expectations of measurement. Jesus speaks often of faith as something that can be measured – He cites people as having little (e.g., Mt. 6:30, 8:26, 16:8) or much (e.g., Mt. 8:10, 15:28) faith. Paul talks about faith growing (e.g., 2 Cor. 10:15, 1 Thess. 1:3), as if one should be able to measure it – perhaps relative to our trials requiring a certain amount of faith (should we consider how to measure in “faith units”?). Peter offers his readers grace in abundance (1 Pet. 1:2, 2 Pet. 1:2) and expects them to “grow in the grace...of Jesus” (2 Pet. 3:18), as if grace is something that can be measured. Jesus even states how one can measure the greatest love (Jn. 15:13). Similarly, hope, joy, and knowledge are all referred to as something measurable in the life of the believer. [10]*

## References

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<http://raebear.net/faith/engineering.php>
2. Knoop, D., “Modeling the Human Operator,” lecture given at LeTourneau University, April 2012.
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6. Hummel, C. E., “Tyranny of the Urgent,” Inter Varsity Press, 1967.
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8. Hummel, op. cit.
9. Tixier, J., “Observation on Things Measured in the Bible,” Christian Engineering Conference 2017.
10. Ibid.