Dynamic System Property: **atis Feedbackness**

(Dynamic system properties are those properties that are part of the theory and describe patterns in time as change occurs within a system or between a system and its negasystem.)

Feedbackness, \( \text{FB}(S_x) = \text{df} \) transmission of *fromput* through a negasystem to *input*.

\[
\text{FB}(S_x) = \text{df} \sigma(S_x) | \sigma(x) = (f_I \circ f_E \circ f_O)(x)
\]

Feedbackness is the result of a system state-transition function; such that it is a composition of feedout, feedenviron and feedin.

Positive and negative feedbackness definitions are as follows:

\[
\text{FB}^+ = \text{df} \mathcal{A}(f_I)_{t(1)} < \mathcal{A}(f_I)_{t(2)} \\
\text{FB}^- = \text{df} \mathcal{A}(f_O)_{t(1)} > \mathcal{A}(f_I)_{t(2)}
\]

APT&C (Analysis of Patterns in Time), \( \mathcal{A} \), analyses measure positive and negative feedback. APT&C analyses determine measures of system state, and a comparison of these measures before and after feedback determines positive or negative feedback.

Feedback was initially conceived as a process by which information is produced by a system that is then reintroduced into the system in a manner that helps the system self-regulate. Feedback in the physical sciences has been used to control various types of systems—temperature, fuel flow, electrical surges, float valves for water/liquid levels, and biological regulators. These types of feedback are quite basic; that is, they are measures provided to a system that induces the system to adjust its relation-set so as to re-establish its *set point*; that is, the initial desired system parameters.

If feedback produces no change, then it is a Feedback Identity System. If there were substantial modification of the *fromput* so that the feedback is not recognizable, then we would have a Feedback Zero-Neutralized System. Any modification of the initial *feedout* is the result of the negasystem’s derived production output. For most, if not all, social systems, any initial *feedout* will be modified in some way, resulting in a derived production input that is distinctly different from the *fromput*. To understand this process, consider the feedback diagram shown below.

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Feedback is transmitted from fromput through output where it may be modified by the negasystem (system environment), $S_2$, before being transmitted to toput, where it may modify other toput components, and then be transmitted into the system as input. The system, $S_1$, responds to the feedback-modified-input by adjusting its system state parameters accordingly to maintain the initial set point.

Consider, for example, an Identity Feedback System characterized by an airplane autopilot. The set point is 270 knots, 10,000-foot altitude, and a heading of $175^\circ$. The airplane instrumentation provides the actual airspeed, altitude and heading as output.

For autopilot control we have the following: $x(t) = (270, 10,000, 175^\circ)$, $y(t) = S_1(w(t)) = (270, 10,000, 175^\circ)$ — the airplane instrumentation readings, $w(t) = x(t) - S_2(y(t)) = (270, 10,000, 175^\circ) - (270, 10,000, 175^\circ) = (0, 0, 0)$; therefore, $x(t) - w(t) = (270, 10,000, 175^\circ)$. For an Identity Feedback System, where output equals input, no system adjustment is required.
However, if there is a change in output for any of these parameters, then we might have:
\[ y(t) = S_1(w(t)) = (268, 9,500, 177^\circ), \]
\[ w(t) = x(t) - S_2(y(t)) = (270, 10,000, 175^\circ) - (268, 9,500, 177^\circ) = (2, 500, -2); \]
therefore, \( x(t) - w(t) = (268, 9,500, 177^\circ) \). In this case, \( S_1(w(t)) \) must compensate for the 2 knots to bring it back up to 270 knots, the 500 feet to bring it back to 10,000 feet, and the \(-2^\circ\) to bring it back to 175° which is the set point; that is, the controlling parameters.

In physical applications similar to that shown above, the feedback is the output determined by the system instrumentation and there are no additional modifications except that which may be required due to problems relating to the transmission of the data.

This is not the case when considering the intentional systems of the social sciences. For these intentional systems there may be substantial modification of the output before it is transmitted to the toput of the system. For example, the problems encountered by the founder of Cybernetics, the science of feedback, Norbert Weiner, is a classic example of disinformation that caused his own personal implosion that terminated what should have been a much more recognized scientific development. His own wife undermined his professional relations with his colleagues by providing him with the disinformation that his daughter had slept with those colleagues. He believed her and cut off all communications with them, thus destroying the very collaborations that had been promoting his scientific discoveries. In this case, the output from the system, which was benign, was grossly distorted and reintroduced into the “Norbert Weiner System” as toput that was internalized as input. With this internalization, the “Norbert Weiner System” responded to that disinformation as though it were true and acted on it, producing an output that destroyed the collaborative system that he had with his colleagues. In this case, the purported feedback could not actually be traced to the output, since the compatibility of the output and toput would essentially be zero. This is an example of a Feedback Zero-Neutralized System. If this type of feedback had been provided to the autopilot in the previous example, the airplane would have “adjusted” by climbing rapidly to 20,000-feet, while turning almost 180° in the opposite direction while attempting to obtain 536 knots, possibly outside the range of the engine. Under these conditions, the airplane as a system would be destroyed—as was the “Norbert Weiner System.”

From the applications in the physical sciences considered above, it is seen that we have essentially ignored the impact of the negasystem (environment) on the system output. The reason is that the negasystem has had minimal impact on the toput that resulted from the feedback. This is not the case with Intentional Systems. In these cases the negasystem must be treated as a system with all of the possible affect relations that may be established. This is especially the case when considering the negasystem property for derived production output. Derived-production output is defined as follows:
Derived-production output, \( \text{DP}^{f}_{T} \), feedthrough with a high dissimilarity of toput and output in which output is significantly more complex.

The greater complexity of intentional system feedback is shown in the diagram below.

Feedback

Feedback is shown as it is initiated in fromput, transmitted to output, through the negasystem, to toput, and finally transmitted to input. As seen here, feedback may be influenced by its transmission through the negasystem. While many representations of feedback show only the loop exiting the system, curving around in the environment, and then re-entering the system, for ATIS-type systems the environment will practically always have a substantial influence on the feedback. For that reason, the partitions of the negasystem are shown as the feedback is transmitted through each partition. From this transmission, it is seen that the regulator may influence feedback, as also will the negasystem derived production output as it passes through the negasystem storeput, and then by the filter as it re-enters the system.
In the case of feedback with respect to the system, $S_1$, the output is the input for the negasystem, $S_2$. For Intentional Systems, this input can undergo significant changes as a result of $S_2$ action. $S_2$ action can produce derived-production output that is significantly different from the input. When it does so, that is the feedback that is transmitted to $S_1$ for input; that is, $S_2$ produces derived-production input for $S_1$.

For example, the empirical evidence confirms that human activity is insignificant in terms of any contribution to the phenomena of global warming. However, the Intentional System represented by the Atmospheric Scientists has a goal of raising money for atmospheric research. Hence, the feedback to the General Public System is that there is a problem with human activity relating to global warming that needs to be funded so the Atmospheric Scientists can continue to obtain research income. In this case, the negasystem has created derived production output that is substantially different and more complex than the research results that were used to produce the output. (It should be noted that any manipulation, revision, construction, etc. of input will result in an output that is more complex by the very nature of such activity.)

Another example is the initiation of the Viet-Nam War. The Gulf of Tonkin Incident never occurred, and yet it was used as the basis to initiate the war. Again, there was derived-production output created to achieve a goal of an Intentional System, the American Government, which was significantly different from the output of the Viet-Nam System from which the input to the American General Public System was derived.

For school systems, one must always be alert for derived-production output being submitted as top input for a system. Frequently, these come in the form of promoting various “agendas.” Such agendas may relate to efforts to preclude the closing of a school, the hiring of new teachers who may embellish their résumés, the claims made by new instructional programs or the promotion of text books, the financial needs of a school system demanding increased taxes, etc. Students may graduate who wish to support or harm the efforts of the school system. Such efforts are compromised by whatever derived production output these students wish to present to support the goals of their own Intentional Systems. Are they trying to redefine science so that mathematics is no longer a filter for students to take physics? Are they trying to redefine science so that intelligent design can “compete” with evolution? Whatever the goal is of an Intentional System, one must be careful to critically analyze the derived-production output of such systems.

To a great extent, and more so than in the physical sciences, the derived-production output of the negasystem of Intentional Systems is responsible for the positive and negative feedback obtained by the Intentional System.