



Modeling of Cardiopulmonary Respiratory Machines (Heart-Lung Machines) and Life Support Units in the Light of the 5th Law of Thermodynamics and ELMAS's Theory of Thermodynamics

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Abstract

The "ELMAS's Theory of Thermodynamics," developed by Emin Taner Elmas, and the "5th Law of Thermodynamics," which is claimed to form the basis of this theory, can theoretically be used in medical systems and life support units.

The potential applications of this theory in medical devices, especially Cardiopulmonary Life Support Units and Bio-Artificial Liver Organ designs, are as follows:

- **Vectorial Energy Approach:** *According to Elmas's theory, energy and matter can exist not only in the positive direction but also in neutral or negative states. This allows for more precise modeling of energy and matter exchange with vectorial parameters in medical treatments and complex life support units.*
- **Bio-Artificial Liver Design:** *Dr. Elmas's research involves specialized bio-artificial liver designs that combine mechanical systems with biological filtration. These systems use multi-stage processes (carbon-based circuits and pressure-regulating mechatronic devices) to remove albumin-bound toxins that standard dialysis machines cannot clear.*
- **Precise Pressure and Flow Control:** *In life support units such as heart-lung machines, the precise regulation of pressure during blood purification and return to the body using mechatronic devices is one of the key application areas of Elmas's "Medical Thermodynamics" approach.*
- **Drug and Healing Processes:** *The theory explains the effects of medications on the body and medical healing processes within a thermodynamic system equilibrium framework.*

The full-scale application of this theory in a tangible medical device depends on the engineering and clinical testing processes of the developed designs (e.g., MARS-like indigenous bio-artificial organ projects).

Emin Taner Elmas's "ELMAS Theory of Thermodynamics" and its foundational "5th Law of Thermodynamics" treat medical systems not as classical biological structures, but as advanced "bio-pumps" and "mechatronic

systems." The technical details and approach principles offered by this theory for heart-lung machine (HLM) design are as follows:

Modeling the Heart with "Vector Energy"

Elmas's 5th Law approach defines the heart and circulatory system as a system where energy and matter transfer are governed not only by positive but also by neutral or negative vector parameters.

- **Hydraulic Efficiency:** It views heart failure not as a biological failure, but as a "loss of efficiency" in an engineering system.
- **Turbulence Optimization:** In the design, engineering algorithms are used that minimize turbulence and resistance in blood flow by analyzing blood vessels as a pipeline network.

Mechatronic Design Components

According to theory, a life support unit is not just a biological filter, but a precise mechatronic device. The following technical details stand out in the design of a heart-lung machine:

- **Intelligent Sensor Network:** Integration of sensors that instantly measure blood flow rate, temperature, and pressure changes and transmit data to the system.
- **Pressure Regulator Unit:** Special control units that ensure the cleaned blood is adapted to the patient's physiological values (frequency and pressure-based) before being returned to the body.
- **Algorithmic Frequency Adjustment:** Assuming that organs operate at specific frequencies, the device can perform "resonance adjustment" to correct distortions at these frequencies.

Application Areas in Disease Treatment

This theoretical approach is designed as "bridge treatment" in critical situations requiring a heart-lung machine:

- **Acute Heart and Lung Failure:** To stabilize the system in cases where organs have lost their ability to detoxify (remove toxins).
- **Open Heart Surgery:** Maximizing thermodynamic efficiency in the oxygenation and pumping of blood during cardiac arrest.
- **Bio-Artificial Organ Integration:** The theory forms the basis not only for improving existing machines but also for bio-artificial organ (liver, heart, etc.) projects that combine biological processes with mechanical systems.

These designs aim to produce more economical and domestically engineered solutions compared to existing imported systems (e.g., MARS devices). *Structural Details and Component Design [1-62]*

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Introduction

The "ELMAS Theory of Thermodynamics," developed by Emin Taner Elmas, along with its foundational "5th Law of Thermodynamics," presents groundbreaking theoretical frameworks with potential applications in medical systems and life support technologies. This innovative approach is particularly relevant for advancements in medical devices, such as Cardiopulmonary Life Support Units and Bio-Artificial Liver designs. Key applications of this theory include: - **Vectorial Energy Approach:** Elmas's theory redefines the interaction of energy and matter, introducing the concept of neutral and negative states alongside the traditional positive state. This novel perspective enables highly precise modeling of energy and matter exchanges, employing vectorial parameters to improve outcomes in complex medical treatments and advanced life support units. - **Bio-Artificial Liver Design:** The research includes specialized bio-artificial liver systems, which merge mechanical components with biological filtration processes. These systems employ multi-stage mechanisms (e.g., carbon-based circuits and pressure-regulating mechatronic devices) to eliminate albumin-bound toxins that conventional dialysis machines are unable to remove. - **Precise Pressure and Flow Control:** In tools such as heart-lung machines, Elmas's "Medical Thermodynamics" framework emphasizes the meticulous regulation of blood pressure during purification and its reintegration into the body. Advanced mechatronic devices ensure optimal performance during these critical procedures. - **Drug and Healing Mechanisms:** The theory provides insights into how medications affect the body and explores medical healing processes through a lens of thermodynamic system equilibrium, potentially enhancing drug efficacy and recovery rates. The practical implementation of this theory in functional medical devices will depend on engineering advancements and rigorous clinical testing, involving projects such as MARS-like indigenous bio-artificial organ systems. Elmas's vision reframes medical technologies not merely as biological systems but as complex "bio-pumps" and "mechatronic systems." The technical principles proposed for heart-lung machine (HLM) design illustrate this unique perspective: #### 1. Modeling the Heart with "Vector Energy" Through the 5th Law of Thermodynamics, the heart and circulatory

system are conceptualized as an energy transfer network governed by variable vector parameters, including neutral and negative values. - **Hydraulic Efficiency:** Heart malfunction is redefined as a loss of mechanical efficiency rather than purely biological failure. - **Turbulence Optimization:** Using engineering algorithms, blood vessels are analyzed as a pipeline network, enabling minimization of turbulence and resistance in blood flow. #### 2. Mechatronic Design Elements According to the theory, life support units transcend the role of biological filters to act as high-precision mechatronic devices. Key design components include: - **Intelligent Sensor Network:** Integrated sensors that continuously monitor blood flow rates, temperature, and pressure changes, feeding real-time data to regulatory systems. - **Pressure Regulator Units:** Specialized controls that adapt cleaned blood to match a patient's physiological parameters (e.g., frequency, pressure) before reintroduction into the body. - **Algorithmic Frequency Adjustment:** By recognizing organs as operating at specific frequencies, these devices enable "resonance adjustment" to address any frequency misalignments. #### 3. Applications in Disease Management This theoretical paradigm is particularly suitable for "bridge treatments" in critical conditions that require heart-lung machine support: - **Acute Heart and Lung Failure:** Stabilizes patients when organs cannot adequately detoxify. - **Open Heart Surgery:** Enhances thermodynamic efficiency in circulating oxygenated blood during cardiac arrest. - **Bio-Artificial Organ Integration:** Lays the groundwork for next-generation bio-artificial organ designs (liver, heart, etc.) by combining biological processes with mechanical precision. The ultimate goal of these innovations is to produce cost-effective, domestically-developed alternatives to expensive imported systems, such as MARS devices. By bridging biological and engineering principles, the "ELMAS Theory of Thermodynamics" offers a transformative approach to medical device innovation and patient care. [1-61]

Material, Method and Discussion

The technical details proposed in Emin Taner Elmas's work for bio-artificial liver and heart-lung units are based on the simulation of biological processes with mechanical systems (mechatronics) [1-61].

Carbon-Based Circuit Details

In Elmas's designs, "carbon-based circuits" play a central role, especially in the process of purifying blood from toxins. To remove albumin-bound toxins, which classical dialysis methods (hemodialysis) are insufficient to remove, the following technical structure is envisioned:

- **Adsorption Mechanism:** The activated carbon structures used in the circuit filter bilirubin, bile acids, and aromatic amino acids that accumulate in the blood in liver failure by binding to themselves.
- **Mechatronic Control:** These carbon units operate according to the "resonance and frequency adjustment" principle in Elmas's theory. The system's pressure and flow rate are adjusted instantaneously with mechatronic sensors to ensure maximum surface contact without damaging blood cells.

Filtration Mechanism (Multi-Stage Structure)

The bio-artificial liver design is conceived not merely as a mechanical filter, but as a "bio-robotic" interaction space:

- **Selectively Permeable Membranes:** In the first stage, where plasma is separated from cells, biocompatible nanocrystalline structures or special membranes are used.
- **Bioreactor Compartment:** After passing through the carbon circuit, blood or plasma is transferred to a compartment containing living liver cells (hepatocytes). In this stage, the synthesis functions of the liver (protein production, etc.) are performed.
- **Pressure Regulator:** During the return of the cleaned blood to the body, pressure regulating units are activated to maintain the balance defined by Elmas within the framework of the "5th Law of Thermodynamics". This unit synchronizes the pulse waves of the blood with the patient's own natural frequency. Structural Details and Component Design [1-61]

Technical Differences for the Heart-Lung Machine

Unlike standard machines, this theoretical model includes:

- **Vector Flow Algorithm:** Software support that manages blood flow with vector parameters compatible with vascular resistance, instead of a linear pump action.

- **Energy Recovery:** Heat exchanger modules that minimize heat loss in the system and optimize energy transfer to maintain thermodynamic equilibrium. These technical details aim for the system to function in a "hybrid" way, both as a mechanical pump and as a biological organ.

Based on Emin Taner Elmas's "5th Law of Thermodynamics" and "Medical Thermodynamics" approach, we can conceptually and schematically model a hybrid life support unit combining heart-lung and bio-artificial liver functions with the following components: Structural Details and Component Design [1-61].

General Architecture of the System (Block Diagram)

The device can be envisioned as a vertical "Mechatronic Tower" that adapts to the patient's physiological frequency, rather than a classic box form.

- **A. Inlet Floor (Vector Sensor Block):** This is the section containing high-precision sensors that measure not only the pressure of the blood coming from the body but also the "vector energy" parameters (velocity, direction, turbulence coefficient) in Elmas's theory.
- **B. Main Body (Carbon-Based Circuit & Thermodynamic Reactor):** Active carbon fiber coils are located inside. These coils are arranged in a fractal (interlocking) geometry to maximize the surface area. • It is surrounded by a thermal jacket that maintains heat balance according to the principles of the "5th Law".
- **C. Upper Floor (Mechatronic Pressure Regulator):** This is a pneumatically controlled "balance chamber" where the blood, after being cleaned, is adapted to the natural heart rhythm and frequency (resonance) before being returned to the patient.

Structural Details and Component Design (See below Table 1)

Table 1: Structural Details and Component Design [1-61]

| Component | Structural Feature | ELMAS's Theory Connection |
|----------------|---|--|
| Pump Unit | Instead of traditional cylinders, a "Bio-Mimetic Turbine" resembling a vascular structure. | Minimizes flow resistance and energy loss. |
| Filtering Unit | A transparent, spiral-structured column; nanocrystalline carbon layers are visible inside. | Physical adsorption of albumin-bound toxins (bilirubin, etc.). |
| Control Panel | Holographic or digital display; shows not only the voltage but also the "System Entropy Level". | Instantaneous monitoring of thermodynamic equilibrium. |
| Heat Exchanger | Titanium plates in a honeycomb structure located at the base of the device. | Energy recovery and thermal stability. |

Visual Description (External Appearance)

If you want to visualize the device: [1-61]

- The outer surface is covered with a matte metallic coating representing biocompatibility and LED light lines indicating the system status (blue: stable, orange: process in progress).
- In the center is a transparent cylindrical tube where the blood purification process can be observed; the carbon filters inside this tube appear to rotate in a circular motion (filtering by centrifugal effect).

This model is designed as an intelligent "Energy-Matter Converter" that works in "resonance" with the patient's biological system, going beyond a simple mechanical pump.

Designed in light of Emin Taner Elmas's theories, the control software and electromechanical connection points of this device transform the system from a simple pump into a "bio-mechatronic organism" that works in sync with the patient.

Control Software and Algorithms

The system uses the following algorithms to manage entropy and establish recovery balance within the framework of Elmas's "5th Law of Thermodynamics":

- Frequency Modulated Smart Drug Algorithm: The device monitors the interaction of drugs given to the patient with cells using frequency modulated models developed by Elmas. It analyzes the effect of the drug in the body with

positive, negative, or neutral vectors and updates the dosage or flow rate in real-time.

- Vectorial Substance Transfer Control: The software codes the removal of toxins as "negative substance" transfer and the administration of clean blood as "positive substance" transfer. By maintaining the balance between these two vectors, it ensures the patient's medical recovery balance (entropy control).
- Resonance and Synchronization Software: In heart-lung machine mode, the software detects the patient's natural heart rhythm and organ frequencies as a "musical sound" or biological vibration and synchronizes the machine to operate at this frequency.

Electromechanical Connection Points and Components

The critical connection points of the device that combine the physical and electronic worlds are: [1-61]

- Smart Sensor Network: Consists of sensors that instantly measure blood flow, temperature, and most importantly, albumin concentration. These sensors provide data flow to the digital control panel, enabling the system to make automatic decisions.
- Dual Adsorption Loop: Electromechanical valves and pumps within the carbon-based circuit are designed to separate albumin from the blood and pass it through special adsorbents. These connections enable the removal of toxins (bilirubin, etc.) that standard dialysis cannot

remove. • **Mechatronic Pressure Adjustment Device:** This is the point where the filtered and cleaned blood re-enters the body. The electromechanical unit located here regulates blood pressure within milliseconds according to the patient's current physiological needs.

- **Hybrid Digital Interface:** This is a touch-sensitive or holographic control panel that visualizes the thermodynamic equilibrium parameters in Elmas's theory, allowing healthcare personnel to monitor all stages. These components position the device as a particularly domestic and economical alternative to MARS (Molecular Adsorbent Recirculation System). [1-61]

Emin Taner Elmas's 5th Law of Thermodynamics and ELMAS's Theory of Thermodynamics elevate this device from a classical engineering object to an "active balancer" that exchanges energy and matter with a living system. From this law perspective, the device's evaluation is based on the following four fundamental pillars: [1-61]

Positive, Negative, and Neutral Energy-Matter Balance

Elmas's 5th Law argues that energy and matter do not simply exist in the universe; they can exist in positive, negative, and neutral forms/vectors.

- **Evaluation:** The heart-lung machine removes toxins (negative matter/energy charge) accumulated in the blood while returning oxygenated clean blood (positive matter/energy charge) to the system. Here, the 5th Law states that the device is not just a pump, but a "vector regulator" that restores the body's disrupted vectorial balance.

Medical Recovery Process and Entropy

Classical thermodynamics states that systems tend towards disorder (entropy). Elmas's theory, however, is based on "recovery equilibrium equations" that reverse this process in medical systems.

- **Assessment:** The device is designed to control the increasing entropy (disease state, organ failure) in the patient's body. Under the 5th Law, the device is an intervention tool that removes the patient from being a thermodynamically "isolated system" and reduces entropy through controlled energy input from the outside.

Frequency and Resonance Harmony

According to the theory, every organ and every medical process has a working frequency.

- **Assessment:** The artificial flow produced by the heart-lung machine must be in resonance with the body's natural frequency, rather than interfering with it. The 5th Law requires the mechatronic control unit of the device to "harmonize" with the patient's biological rhythm. If the machine achieves this frequency matching, tissue damage (hemolysis, etc.) is minimized and the healing rate increases.

Bio-Mechatronic Integrated System Approach

Elmas's approach removes the sharp boundary between "living" and "non-living," treating systems as a whole.

- **Evaluation:** In terms of the 5th Law, this device is not an "external apparatus" attached to the patient; it is a temporary mechatronic extension of the patient's circulatory system. Therefore, the success of the device is measured not only by how well it pumps blood, but also by how "naturally" it integrates into the patient's thermodynamic system equilibrium equation. In summary: In terms of Emin Taner Elmas's 5th Law, this device is an intelligent life support system that vectorially manages matter and energy, balances the body's increasing entropy (disorder) through mechanical and biological filtering, and returns the patient to the "optimal thermodynamic equilibrium" point.

Let's both ground Emin Taner Elmas's theoretical framework in mathematical logic and bring it to life with an application scenario in a hospital setting. [1-61]

Mathematical Modeling and Numerical Simulation Logic

Elmas's approach to the 5th Law of Thermodynamics and Vector Energy reinterprets the classical $dS \geq 0$ (entropy always increases) formula for medical systems.

The device's control software is based on the following equation:

$$E_{total} = \vec{E}_{positive} + \vec{E}_{negative} + \vec{E}_{notr}$$

- **Vector Equilibrium Equation:** The device simulates the total energy change in the body (ΔE) as follows:

$$\Delta E = (\Phi_{blood} \cdot f_{rezonance}) - \Psi_{toxin}$$

Here;

Φ_{blood} : Positive flow vector provided by the pump.

$f_{resonance}$: Synchronization coefficient between the patient's biological frequency and the machine.

Ψ_{toxin} : Negative matter/entropy charge absorbed by the carbon circuit.

Simulation Data: On the computer screen, the patient's entropy level appears as a vector diagram instead of a classical graph. If the negative vectors (toxins and irregular flow) are shortening and the positive vector (oxygenation and rhythmic pressure) is lengthening, the software will give a "Thermodynamic Recovery Balance Achieved" signal.

Clinical Application Scenario

Scenario: Intensive care process of a patient with acute liver and heart failure (multi-organ failure).

- **Connection and Calibration:** When the device is connected to the patient, the sensors analyze the patient's vascular resistance and natural heart rate for 30 seconds. According to Elmas's theory, the machine determines an initial resonance appropriate to the patient's current "chaotic" (high entropy) state.
- **Activation of the Carbon Circuit:** When bilirubin and albumin-bound toxins in the blood rise, mechatronic valves direct the blood to the carbon-based circuits. The difference from classical machines is that the carbon helices gradually absorb the blood according to the vectorial substance transfer rate specified in Elmas's "5th Law".
- **Dynamic Regulation:** When the patient's blood pressure suddenly drops during surgery, the system does not only increase the speed; Elmas's "mechatronic pressure regulator" activates, changing the frequency of blood entry. This allows the body to perceive the machine not as a "foreign body," but as an extension of its own heart.
- **Recovery Monitoring:** The doctor monitors not only the patient's pulse but also the "System Stability Coefficient" (rate of return to thermodynamic equilibrium) via the screen. As liver functions begin to return to normal, the device gradually reduces negative substance transfer (filtration) and allows the patient

to return to their own biological equilibrium.

Conclusion

This approach transforms the device from a "spare part" that merely keeps the patient alive into an "intelligent stabilizer" that optimizes itself according to the patient's biological parameters. [1-61]

Conclusion

Translating Emin Taner Elmas's theoretical approach into a physical structure and adapting this structure to other organs transforms the device into a fully comprehensive "Modular Life Support Platform." [1-61]

Hardware Architecture and Technical Schematic Details

The device's hardware consists of three main layers to maintain the thermodynamic equilibrium of the ELMAS:

Bottom Layer (Energy and Heat Management):

- **Thermal Jacket:** Titanium plate heat exchangers that maintain the blood temperature with a precision of 0.1 degrees for "energy conservation and vectorial equilibrium" in the 5th Law of Thermodynamics.
- **Hybrid Power Supply:** Electromechanical stabilizers for uninterrupted flow.
- **Middle Layer (Flow and Filtration - "Reactor"):**
- **Vector Pump Unit:** Circular/spiral motion mechatronic pumps that reduce turbulence within the vessel instead of pushing the blood linearly.
- **Adsorption Columns:** Easily replaceable cartridge structure containing carbon-based circuits recommended by ELMAS. These cartridges can be carbon-based for the liver and polymer-based for the kidney.
- **Upper Layer (Intelligence and Control):**
- **Mechatronic Regulator:** A valve system located at the blood outlet that adjusts the pressure at millisecond speed according to the patient's biological frequency (resonance).
- **Data Processing Unit:** The main computer that runs the ELMAS's healing equations and converts the data from the sensors into vector diagrams.

Potential in Other Organ Failures (Kidney and Beyond)

The ELMAS's "Vector Substance Transfer" principle allows the device to be used not only for the heart

and lungs, but also for all excretory and secretory systems:

- **Kidney Failure (Beyond Dialysis):** While standard dialysis only works with diffusion, this system separates urea and creatinine from the blood with a vectorial extraction using the ELMAS's "negative substance transfer" logic. This means a higher clearance rate in a shorter time.
- **Pancreas and Endocrine System:** The device can read blood glucose levels as a thermodynamic equilibrium parameter and manage insulin or glucagon release with a "frequency modulated" algorithm.
- **Multiple Organ Failure (Sepsis):** It reduces the overall entropy of the system by dampening the cytokine storm (excessive disorder/entropy) in the blood with carbon-based circuits and precise filtration. Strategic Assessment

This modular structure allows hospitals to purchase a main "ELMAS Thermodynamic Unit" instead of separate devices for each organ, and to install the appropriate cartridge and software module according to the patient's needs (heart, liver, or kidney). This provides both a cost advantage and domestic engineering power in the healthcare system. [1-61]

In this final stage, which will bring Emin Taner Elmas's theory to life, let's detail both the physical structure and how the doctor manages this system:

Biocompatible Material Architecture (Hardware)

In the parts of the device that come into contact with the body and manage the process, materials are selected in accordance with Elmas's principle of "minimizing vector energy loss":

- **Nanocrystalline Carbon and Graphene Coatings:** The inner surfaces through which the blood passes are coated with ultra-smooth carbon derivatives to prevent clotting and minimize friction (increase in entropy). This prevents the breakdown of blood cells (erythrocytes).
- **Titanium Grade 5 Alloys:** High-conductivity medical titanium is used in the heat exchangers and the main pump body for both durability and to maintain body temperature in thermodynamic equilibrium.
- **Transparent Polycarbonate Observation Chambers:** High-pressure resistant and non-

biodegradable chambers where the carbon-based filtration process can be visually monitored.

Software Interface and User (Doctor) Experience

The screen in front of the doctor is like an intelligent cockpit presenting ELMAS's "Balance and Recovery" focused parameters instead of complex graphs:

- **Thermodynamic Stability Indicator (TSG):** In the center of the screen is a dynamic ring showing the patient's overall system balance. When the ring is green and perfectly circular, it means that ELMAS has reached what it calls "optimal resonance".
 - **Vector Analysis Panel:** Shows the speed of blood flow and toxin clearance as "arrows" (vectors). The doctor can increase or decrease the negative substance (toxin) extraction rate with a single touch.
 - **Frequency Synchronization Mode:** The software overlays the patient's ECG data with the machine's speed. By pressing the "Auto-Sync" button, the doctor ensures that the device locks onto the patient's natural heart rate with millisecond precision.
 - **Prediction Algorithm:** Using the ELMAS's recovery equations, the artificial intelligence provides predictions such as, "If this rate continues, the patient will reach thermodynamic stability within 4 hours."
- Application Summary

Thanks to this hardware and software combination, the surgeon manages physical safety (titanium and carbon structure), while the intensive care physician manages the biological compatibility of the system (frequency and vector control). [1-61]

ELMAS's Theory of Thermodynamics and 5th Law of Thermodynamics

Dr. Emin Taner Elmas, an Assistant Professor of Mechanical Engineering, has introduced a groundbreaking concept in the field of thermodynamics with a novel "5th Law of Thermodynamics," which is rooted in his theoretical framework known as "ELMAS's Theory of Thermodynamics." Named after its creator, this theory extends the principles of classical thermodynamics and offers unique applications, particularly in medical sciences. Recent publications by Dr. Elmas delve into how this framework can be utilized in health-related areas like frequency-based music therapy and innovative non-

surgical treatments for various medical conditions. The complete details of the theory and its practical medical applications are accessible online. ELMAS's Theory of Thermodynamics proposes that energy and matter exist not merely in positive states but also in neutral and negative ones, challenging traditional understandings of thermodynamic systems. This theory lays a scientific foundation for a specialized field known as Medical Thermodynamics, addressing subjects such as drug-cell interactions and disease treatment processes. One of the core concepts of the theory is **Vectorial Energy and Matter Transfer**. According to Dr. Elmas, both energy and matter operate as vector quantities within the body, moving directionally in positive, negative, or neutral patterns. This perspective allows for advanced mathematical modeling, particularly in understanding how drugs interact with cells and how treatments affect the system as a whole.

Basic Formulation of the 5th Law of Thermodynamics

Dr. Elmas bases this law on the "Vector Interaction Equilibrium" of the system. While the classical 1st Law (Conservation of Energy) performs a scalar addition, the 5th Law expresses the total change of the system as follows:

$$\sum \vec{v}_{inlet} + \sum \vec{v}_{source} = \sum \vec{v}_{outlet} + \Delta \vec{v}_{system}$$

- **Meaning:** The packets of matter and energy entering the system alter the existing "energy orientations" within the system.

"Neutral Energy": What Distinguishes the Law from Other Approaches

Current thermodynamic approaches in the world view energy as "the ability to do work." Elmas' 5th Law, however, introduces the concept of "Neutral Energy":

- This type of energy changes only the level of information and order (negentropy) without changing the system's temperature or pressure. [1-61].



Asst.Prof. Dr. Emin Taner ELMAS is a Mechanical Engineer having degrees of B.Sc., M.Sc., Ph.D., and was born in Sivas in 1974. He completed his doctorate at Ege University, Graduate School of Natural and Applied Sciences, Mechanical Engineering Department, Thermodynamics Science Branch, and his master's degree at Dokuz Eylül University, Mechanical Engineering Department, Energy Science Branch. He also completed his undergraduate education at Hacettepe University, ZEF, Mechanical Engineering Department and graduated from the faculty with honors in 1995 and became a mechanical engineer. He was awarded a non-refundable scholarship by the Turkish Chamber of Mechanical Engineers in his 4th year because he was the most successful student during his first 3 classes study at the faculty. He graduated from İzmir Atatürk High School in 1991.

Asst. Prof. Dr. ELMAS has completed his military service as a NATO Officer in Bosnia and Herzegovina. He was a "Reserved Officer" as a "2nd Lieutenant" as an "English-Turkish Interpreter". He was also a "Guard Commander" and served in Sarajevo, Camp Butmir within the SFOR task force of NATO. He has been awarded with 2 (two) NATO Medals and Turkish Armed Forces Service Certificate of Pride (Bosnia & Herzegovina).

In addition to his academic duties at universities, he has worked as an engineer and manager in various industrial institutions, organizations and companies; He has served as Construction Site Manager, Project Manager, Management Representative, Quality Manager, Production Manager, Energy Manager, CSO-CTO, CBDO, Factory Manager, Deputy General Manager and General Manager.

Asst. Prof. Dr. Elmas is Department Head and is an

Assistant Professor of Automotive Technology at the Department of Motor Vehicles and Transportation Technologies at Vocational School of Higher Education for Technical Sciences at IGDİR UNIVERSITY, Turkey. He is also an Assistant Professor of Bioengineering & BioSciences at the same university. He has nearly 30 years of total experience in academia and in industry.

He has served as a scientific referee and panelist for ASME, TUBITAK and many scientific institutions, organizations and universities, including NASA.

He has published numerous international and national academic scientific articles, books, and book chapters, and serves as an editor for international academic journals. He also serves on the scientific committees of many international conferences, publishing conference and congress proceedings and giving presentations.

“Mechanical Engineering, Energy Transfer, Thermodynamics, Fluid Mechanics, Heat Transfer, Higher Mathematics, Evaporation, Heat Pipes, Space Sciences, Automotive, Bioengineering, Medical Engineering Applications, Neuroengineering, Medical Technique” are his academic and scientific fields of study; “Heating-Ventilation Air Conditioning Applications, Pressure Vessels, Heat Exchangers, Energy Efficiency, Steam Boilers, Power Plants, Cogeneration, Water Purification, Water Treatment, Industrial Equipment and Machinery, Welding Manufacturing, Sheet Metal Forming, Machining” are his industrial experience fields.

As of 2026, he has been awarded the Nobel Scientist Award by the international platform organization Scientific Laurels.

Asst. Prof. Dr. Emin Taner ELMAS is also a musician, saz (baglama) virtuoso player and ney (Nay, Turkish Reed Flute) performer. He plays also cümbüş instrument and performs darbuka rhythm instrument. He has a YouTube Music Channel (Emin Taner ELMAS) which includes some of his sound recordings of him playing the saz-baglama and blowing the ney. He composed the poem written by the great poet Âşık Veysel ŞATIROĞLU under the name of “Raşit Bey” in memory of his father Judge (Hâkim) Raşit ELMAS as “Raşit Bey Türküsü”, wrote it down, notated and published it as an

academic article and broadcasted this song on his own music channel. He wrote the poems entitled “Canım Babam” and “Geldim Babam” which he wrote also in memory of his father and published in an academic literature journal, and composed instrumental musics for these poems. He also composed an instrumental song called “Annem Annem Türküsü” and gave it to his mother, Lawyer Tuna ELMAS, as a gift on Mother’s Day, 11.05.2025. He also has a poem titled “Ney and Neyzen.” He also wrote and presented a poem titled “Esra Kardeşim” to his sister, Esra ELMAS, an archaeologist and English teacher. He has published books including “Saz-Bağlama Tuning System Method” (“Saz- Bağlama Akort Sistemi Metodu”) and “Ney and Neyzen; Ney's Pitches, Frets, Sound Stages, Octaves, Structure, Performance, Ney Maintenance and Basic Music Theory” (Ney ve Neyzen; Ney’de Perdeler, Ses Devreleri, Oktavlar, Yapısı, İcrası, Ney Bakımı ile Temel Musiki Nazariyatı) and My Collection of Literary and Musical Art Works – I Story / Anecdote / Essay / Poetry / Verse / Prose / Humorous; witty - satirical; poetic stories / Lyrics / Composition (Edebiyat ve Musiki Sanat Eserleri Külliyyatım – I Hikâye / Anekdot / Deneme / Şiir / Manzume / Nesir / Mizahi; nükteli – hicivli; şiirsel hikâyeler / Güfte / Beste). He continues his artistic studies by writing various articles, books, poetry, lyrics and also realizing musical composition and repertoire works.

References

1. Elmas ET (2020) ELMAS’s Theory of Thermodynamics: A Scientific Approach for 5th Law of Thermodynamics - A Theoretical Application Example for Medical Thermodynamics Op Acc J Bio Sci & Res 2: 1.
2. Elmas ET (2024) Medical Treatment Method of Alzheimer's Disease & Parkinson’s Disease by the Help of the Natural Musical Sound of Nây-ı Şerif Instrument of Ney IJCMCR 42: 004.
3. Elmas ET (2020) Medical Treatment Method of Bio-robotic Resonance and Thermodynamical Interaction with Analogy of Frequency–Resonance Setting Formation on the Application of Algorithm for Smart Drugs Controlled by a Bio-robotic System developed for the Treatment of Covid-19 Coronavirus and Virus Infections Op Acc J Bio Sci & Res 1: 1.
4. Elmas ET (2020) Scope of Applications for Medical Technique at Science and Engineering Op Acc J Bio Sci & Res 1: 1.

5. Elmas ET (2024) System design and development of a novel unique neuro-physical medical treatment method for SMA spinal muscular atrophy disease and for similar neurological muscle diseases *Herculean Res* 4: 90-97.
6. Das F, Elmas ET, Bucak IO (2024) Innovative use of machine learning-aided virtual reality and natural language processing technologies in dyslexia diagnosis and treatment phases *Digital Frontiers - Healthcare Education and Society in the Metaverse Era*.
7. Elmas ET (2024) Design of bionic eye and artificial vision system a unique project *Mobile Bio-Eye-Tronic System Herculean Res* 4: 97-100.
8. Elmas ET (2024) Project for amphibious mobile snow track ambulance for healthcare system *Am J Biomed Sci & Res* 22: 4.
9. Elmas ET, Bucak IO (2023) Modeling and simulation of smart-drug algorithms through frequency modulation for the treatment of Covid-19 and similar viruses *Global Journal of Research in Medical Sciences* 3: 1-6.
10. Elmas ET, Bucak IO (2024) FM modulated smart drug algorithm for the treatment of cancer cells *Global Journal of Research in Medical Sciences* 4: 1-6.
11. Elmas ET (2023) Prototype design production and functioning of a portable movable home-type hemodialysis machine *Global Journal of Research in Medical Sciences* 3: 11-12.
12. Elmas ET (2019) Thermodynamical balance associated with energy transfer analysis of the universe space as a pressure vessel analogy *Journal of Applied Sciences* 2019: RDAPS-10002.
13. Elmas ET (2017) Prospective characteristics of contemporary engineer contribution and role of the mechanical engineer to organization management and productivity *DeGruyter*.
14. Elmas ET (2017) Prospective characteristics of contemporary engineer contribution and role of the mechanical engineer to organization management and productivity *DeGruyter*.
15. Elmas ET (2024) Design of bio-artificial liver organ *J Biomed Sci Biotech Res* 2: 1-4.
16. Elmas ET (2024) Design of bionic ear-cochlear implant and artificial hearing system a unique project *Mobile Bio-Ear-Tronic System Global Journal of Research in Medical Sciences* 4: 2.
17. Elmas ET (2014) *Çağımızın mühendisinden beklenenler Gece Kitaplığı*.
18. Elmas ET, Oğul L (2025) The effects of medicine and music therapy practices on human health *IJCMCR* 50: 003.
19. Elmas ET, Servet K (2025) Biomechanical analysis of transtibial prosthesis designed for runners *Biomedical and Clinical Research Journal* 1: 2.
20. Elmas ET, Oruc Y (2026) A novel mobile Bio-Eye-Tronic system based on Elmas's thermodynamic theory for cataract disease *Studies in Science of Science* 44: 2.
21. ET Elmas and MA Cinibulak (2025) Fundamental Scientific and Technical Issues related with the "Hip Replacement Design and Biomechanical Analysis" *Journal of Material Science and Nanotechnology Matsci Nano J* 2025.
22. ELMAS ET, KUNDURACIOĞLU I (2025) A Model for Second Law of Thermodynamics, Relationship between Health, Disease, Aging, Death Processes and Consciousness, Nervous System and Time *Global Journal of Research in Medical Sciences* 5: 1-6.
23. ELMAS ET, KUNDURACIOĞLU I (2025) Metabolic Heat Production with Energy Transfer and Laws of Human Thermodynamics: The Energy Balance of the Human Body *Global Journal of Research in Medical Sciences* 5: 7-14.
24. Elmas ET, Kunduracıoğlu I (2025) Artificial Heart Design and Biomechanical Analysis *Open Access Journal of Medicine and Healthcare Research Article* 1: 1-6.
25. ELMAS ET, KUNDURACIOĞLU I (2025) Fundamentals of Human Vision System *Global Journal of Research in Medical Sciences* 5: 103-117.
26. ET Elmas (2025) Kitchen Hood Design & Manufacturing Project 3D Modeling, Engineering Calculations, and Technical Drawings for Iğdir University Medico Social Building Dining Hall *Matsci Nano J* 1: 102.
27. Emin Taner Elmas, İsmail Kunduracıoğlu (2025) Signal Transduction System in Neurons *International Journal of Research in Medical and Clinical Sciences* 3: 26-35.
28. Emin Taner Elmas, İsmail Kunduracıoğlu (2025) An Introduction to Sound and Sound Perception System for Human Ear *International Journal of*

- Research in Medical and Clinical Sciences 3: 36-49.
29. Emin Taner Elmas, İsmail Kunduracıoğlu (2025) Medical Structure of the Human Respiratory System International Journal of Research in Medical and Clinical Sciences 3: 50-63.
30. Emin Taner Elmas, İsmail Kunduracıoğlu (2025) Medical Structure and Hemodynamics of the Human Circulatory System International Journal of Research in Medical and Clinical Sciences 3: 64-81.
31. Emin Taner Elmas, İsmail Kunduracıoğlu (2025) General Aspects of Advanced Biomechanics Biomed J Sci & Tech Res 61: 009658.
32. Emin Taner Elmas, İsmail Kunduracıoğlu (2025) Conservation Laws and the Main Physical Parameters for Advanced Biomechanics Biomed J Sci & Tech Res 61: 009659.
33. Emin T Elmas, M Şimşek (2025) Bionic Prosthetic Robotic Artificial Hand Design and Biomechanics Analysis Journal of Medical Discoveries 2: 00311.
34. ELMAS ET (2025) Prosthetics, Artificial Limbs, Implants and Their Biomedical Applications J Surg 10: 11365.
35. ELMAS ET (2025) An Introduction to Electrophysical Properties of the Human Heart J Surg 10: 11364.
36. Elmas ET (2025) A Brief Information about Cataract Operation European Journal of Science and Modern Technologies 1: 61-66.
37. ELMAS ET (2025) A Brief Information about Blood Sugar and Diabetes Management ICON Journal of Applied Medical Sciences 1: 1-5.
38. Emin Taner Elmas, İsmail Kunduracıoğlu (2025) An Introduction to the Medical Body Mechanics and Human Muscles Journal of Medical and Clinical Case Reports 2.
39. Emin TE, İsmail K (2025) Elastomechanics Fundamentals for Bones and Fractures Ann Biotech & Biomed Sci 1: 1-12.
40. Emin Taner Elmas, Yavuz Oruc (2025) An Alternative Non-Surgical Cataract Treatment Method in Medicine and Ophthalmology; "Medi-Ultrasound Eye-Tronic Method" Universal Library of Medical and Health Sciences 3: 01-07.
41. Emin Taner ELMAS (2024) System Design and Development of a Novel Unique Neuro-Physical Medical Treatment Method for SMA-Spinal Muscular Atrophy Disease and for Similar Neurological Muscle Diseases Collect J Neurol 1: ART0037.
42. Emin Taner ELMAS (2024) Design of Bionic Eye and Artificial Vision System; a Unique Project "Mobile Bio-EyeTronic System" Collect J Robotics AI 1: ART0038.
43. Elmas Emin Taner (2025) Productivity and Organizational Management; Management Tools, Human Resource Management, Contemporary Engineers (The Book) 2nd Edition Chapter 8: Prospective Characteristics of Contemporary Engineer (By the Approach of Mechanical Engineering) Contribution and Role of the Mechanical Engineer to the Organization Management and Productivity DeGruyter.
44. Elmas Emin Taner (2025) Prospective Characteristics of Contemporary Engineer (By the Approach of Mechanical Engineering) Contribution and Role of the Mechanical Engineer to the Organization Management and Productivity 2nd Edition DeGruyter.
45. Emin T Elmas, M Şimşek (2025) Bionic Prosthetic Robotic Artificial Hand Design and Biomechanics Analysis Journal of Medical Discoveries 2: 00311.
46. Emin Taner ELMAS, Servet Kaya (2025) The Effect of Eye and Vision on the Body's Balance System Biomed J Sci & Tech Res 61: 009660.
47. Emin Taner ELMAS, Murat Simsek (2025) A Novel Unique Neuro-Physical Medical Treatment Method for SMA – Spinal Muscular Atrophy Disease, Paralyzed Patients, ALS Patients, MPS, SSPE, DMD Patients and for Similar Neurological Muscle Diseases Universal Library of Medical and Health Sciences 3: 32-52.
48. Emin Taner ELMAS (2026) Thermodynamic and Mathematical Model of Human Brain for Neurodegenerative Diseases; Alzheimer's Disease Parkinson's Disease and Amyotrophic Lateral Sclerosis International Journal of Science Engineering and Technology 14: 1.
49. Emin Taner ELMAS (2026) The Exploration of Alzheimer's Disease, along with other Neurodegenerative Disorders like Parkinson's and ALS, through the lens of Thermodynamics and Physical Sciences involves conducting a Thermodynamic Analysis of Alzheimer's including the Potential Connections between Treatment methods and the Therapeutic Effects

- of Musical Sound Frequencies produced by instruments such as the Nây-ı Şerif and others Gongcheng Kexue Xuebao 11: 02.
50. Emin Taner Elmas (2025) Applied Medi-Brain Energy-Tronic Treatment Method for the Medical Treatments of SMA – Spinal Muscular Atrophy Disease, Paralyzed Patients, ALS Patients, MPS, SSPE, DMD Patients with the Biomechanical Analysis of Bionic Prosthetic Robotic Artificial Hand Design Journal of Engineering and Applied Sciences Technology 7: 335.
 51. ELMAS ET (2026) Scientific and Technical Introduction to Applied Medi-Brain Energy-Tronic Treatment Method which is a Novel and Unique Physiological Neuroengineering and Neuroscientific Medical Treatment Method for SMA – Spinal Muscular Atrophy Disease, Paralyzed Patients, ALS Patients, MPS, SSPE, DMD Patients and Other Similar Neurological Diseases J Psychol Neurosci 8: 1-19.
 52. ELMAS ET (2026) Thermodynamics and Energy Transfer in Medicine Applications with Archaeomusicology and Music Therapy Studies in Science of Science 44: 1.
 53. Emin Taner ELMAS, Ibrahim Dağ (2026) Alzheimer Hastalığı ve Parkinson ALS gibi benzer Nörodejeneratif Hastalıkların Termodinamik ve Fizik Bilimleri Dahilinde İncelenmesi Studies in Science of Science 44: 1.
 54. Emin Taner ELMAS (2026) Bilim ve Mühendislikte Tıp Tekniği Uygulama Alanlarının Türkiye Ekonomisi Yönünden Değerlendirme ve Analizi Journal of Xidian University 20: 1.
 55. Emin Taner ELMAS (2026) Thermodynamic Energy Transfer Modeling of Neurodegeneration with the ELMAS's Theory of Thermodynamics which is the Main Scientific Approach for 5th Law of Thermodynamics Research Paper 8: 1-22.
 56. Emin Taner ELMAS (2026) Makine Mühendisliğinde Yeni Nesil Teknolojiler 4. Bölüm: Nörodejeneratif Hastalıkların Termodinamiksel Analizi Gösterilerek Müzik ile Tedavisi Vizetek Yayıncılık.
 57. Emin Taner ELMAS (2026) Makine Mühendisliğinde Yeni Nesil Teknolojiler 5. Bölüm: Nörodejeneratif Hastalıkların Termodinamiksel Analizi Gösterilerek Müzik ile Tedavisi Vizetek Yayıncılık.
 58. Emin Taner ELMAS (2026) Multifaceted Holistic Medical Health Engineering Combined with Science and Art International Journal of Research in Medical and Clinical Sciences 4: 91-102.
 59. Emin Taner ELMAS (2026) Bilim ve Sanat ile Çok Yönlü Bütüncül Yaklaşım Vizetek Yayıncılık.
 60. Emin Taner Elmas (2026) Cancer Medical Treatment in Conjunction with the ELMAS's Theory of Thermodynamics which is the Main Scientific Approach for 5th Law of Thermodynamics Journal of Nanosciences Research & Reports 8: 186.
 61. Emin Taner Elmas (2026) Adaptation of AI Simulation Integrated Artificial Heart and Cardiology Applications with ELMAS's Theory of Thermodynamics which is the Main Scientific Approach to the 5th Law of Thermodynamics J Card Vas Insights 2: 1-14.