

# 中医辨证论治的数学表达

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**提 要:** 阴阳五行学说是中医的理论基础, 阴阳五行逻辑是层次极高的逻辑。建立阴阳五行逻辑公式体系, 用数学方法研究中医辨证理论, 探讨解决中医界几千年悬而未决的问题, 是中医理论研究中亟待解决的问题。著名数学家华罗庚说过: “数学是一切科学得力的助手和工具。……任何一门科学缺少了数学这一工具便不能确切地刻划出客观事物变化的状态, 更不能从已知数据推出未知数据来, 因而就减少了科学预见的可能性, 或者减弱了科学预见的精确度”。作者应用数学方法表达中医辨证论治, 使得中医理论问题得到显著简化。限于篇幅, 本文略去了大量的数学推导, 仅就建立阴阳五行逻辑公式体系进行讨论。应用该公式体系不仅可以对中医的治疗方法进行严格的论证, 使中医理论的科学性得到逻辑上的证明, 而且可以由一脏或一腑的盛虚推出适用的中药, 从而使诊断治疗规范化成为可能。

**关键词:** 阴阳五行逻辑 公式体系 辨证论治

中医与西医相比, 最大的优势在于注重整体性、辩证性、转化性和进行辨证论治, 最大的缺陷则在于未能数学化, 尤其是作为其理论基础的阴阳五行学说。由于它几千年来一直处于定性和思辨阶段, 因而能够掌握其全部真谛的名医屈指可数, 这对中医的普及也造成很大的困难。

中医辨证论治的过程就是运用阴阳五行逻辑进行推理的过程。阴阳五行逻辑是层次极高的逻辑。

由于五行可分为阴、阳两仪(就人体而言就是分为脏和腑), 两仪又有阴、阳之分, 阴阳至少可以分为盛、衰、平三种状态, 所以阴阳五行逻辑至少是60值逻辑。这比西方的二值逻辑高出近两个数量级。

在中医理论中, 阴阳的盛衰是一个模糊变量, 可以用对阴和阳的隶属度加以表示。任意一个事物对阴和阳的隶属度之和恒等于1。若对阴的隶属度增大, 则对阳的隶属度减小; 反之亦然。五行之间相生和相克的本源在于其

间具有同一性和对立性, 五行相生相克阴和阳的盛衰变化也为同一性和对立性所决定。因此, 根据同一性和对立性及隶属度的变化规律就可推出阴阳五行逻辑公式体系。应用阴阳五行逻辑公式体系不仅可验证现有治疗方法的正确性, 而且可以从一脏或一腑的盛虚推知其余脏腑的盛虚。根据脏腑的盛虚及每种中药的属性和功能, 就可以推出适用的中药, 从而可帮助医生组方。《伤寒论》中的113方也可由此公式体系推出。

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阴阳五行逻辑公式体系由125个公式组成,本文限于篇幅要求,略去公式的推导,仅就其约定记号和其中与辩证论治有关的基本公式简要介绍如下:

### 一、约定记号

1. 五行中任意一行用 $\alpha$ 或 $\beta$ 表示,其阳仪和阴仪分别在右下角加附标“+”和“-”。

2.  $\alpha$ 生 $\beta$ 和 $\alpha$ 克 $\beta$ 分别用 $(\alpha\beta)$ 和 $\langle\alpha, \beta\rangle$ 表示。

3. 对阴的隶属度增大或阴盛在左上角加附标“ $\uparrow$ ”,对阴的隶属度减小或阴虚在左上角加附标“ $\downarrow$ ”。

4. 对阳的隶属度增大或阳盛在右上角加附标“ $\uparrow$ ”,对阳的隶属度减小或阳虚在右上角加附标“ $\downarrow$ ”。

### 二、阴阳盛虚等价关系

阴盛必然阳虚,阳虚必然阴盛: $\uparrow\alpha\sim\downarrow\alpha$ 。

阳盛必然阴虚,阴虚必然阳盛: $\alpha\uparrow\sim\alpha\downarrow$ 。

阴仪阳盛必然阳仪阴虚,阳仪阴虚必然阴仪阳盛: $\alpha_{-}\uparrow\sim\alpha_{-}\downarrow$ 。

阴仪阴盛必然阳仪阳虚,阳仪阳虚必然阴仪阴盛: $\uparrow\alpha_{-}\sim\downarrow\alpha_{-}$ 。

阳仪阳盛必然阴仪阴虚,阴仪阴虚必然阳仪阳盛: $\alpha_{+}\downarrow\sim\alpha_{+}\uparrow$ 。

阳仪阴盛必然阴仪阳虚,阴仪阳虚必然阳仪阴盛: $\uparrow\alpha_{+}\sim\downarrow\alpha_{+}$ 。

### 三、五行生克阴阳盛虚相关性

1. 如果 $\alpha$ 生 $\beta$ ,那么 $\beta$ 与 $\alpha$ 的盛虚具有同一性

具体讲:

若 $\uparrow\alpha$ 则 $\uparrow\beta$ : $(\uparrow\alpha, \beta) \circ\beta=\uparrow\beta$ ;

若 $\downarrow\alpha$ 则 $\downarrow\beta$ : $(\downarrow\alpha, \beta) \circ\beta=\downarrow\beta$ ;

若 $\alpha\uparrow$ 则 $\beta\uparrow$ : $(\alpha\uparrow, \beta) \circ\beta=\beta\uparrow$ ;

若 $\alpha\downarrow$ 则 $\beta\downarrow$ : $(\alpha\downarrow, \beta) \circ\beta=\beta\downarrow$ 。

2. 如果 $\alpha$ 克 $\beta$ ,那么 $\beta$ 与 $\alpha$ 的盛

虚具有对立性

具体地讲:

若 $\uparrow\alpha$ 则 $\beta\downarrow$ : $\langle\uparrow\alpha, \beta\rangle\circ\beta=\beta\downarrow$ ;

若 $\downarrow\alpha$ 则 $\beta\uparrow$ : $\langle\downarrow\alpha, \beta\rangle\circ\beta=\beta\uparrow$ ;

若 $\alpha\uparrow$ 则 $\beta\downarrow$ : $\langle\alpha\uparrow, \beta\rangle\circ\beta=\beta\downarrow$ ;

若 $\alpha\downarrow$ 则 $\beta\uparrow$ : $\langle\alpha\downarrow, \beta\rangle\circ\beta=\beta\uparrow$ 。

### 四、五行生克主客体强度变化规律

1.  $\alpha$ 生 $\beta$ ,使 $\alpha$ 的强度减小,使 $\beta$ 的强度增大

$$(\alpha, \beta) \cdot \alpha = \alpha^{-}$$

$$(\alpha, \beta) \cdot \beta = \beta^{+}$$

2.  $\alpha$ 克 $\beta$ ,使 $\alpha$ 的强度增大,使 $\beta$ 的强度减小

$$\langle\alpha, \beta\rangle \cdot \alpha = \alpha^{+}$$

$$\langle\alpha, \beta\rangle \cdot \beta = \beta^{-}$$

应用阴阳五行逻辑公式体系,要从一脏或一腑的盛虚推出其余脏腑的盛虚,可以以M, H, T, J, S分别表示木、火、土、金、水,以M<sub>-</sub>, H<sub>-</sub>, T<sub>-</sub>, J<sub>-</sub>, S<sub>-</sub>分别代表肝、心、脾、肺、肾,以M<sub>+</sub>, H<sub>+</sub>, T<sub>+</sub>, J<sub>+</sub>, S<sub>+</sub>分别代表胆、小肠、胃、大肠、膀胱。譬如“肝阳虚”即M<sub>-</sub><sup>↓</sup>。由此可致

$$(M_{-}^{\downarrow}, H_{-}) \circ H_{-} = H_{-}^{\downarrow},$$

$$\langle M_{-}^{\downarrow}, T_{-} \rangle \circ T_{-} = \uparrow T_{-},$$

$$\langle J_{-}, M_{-}^{\downarrow} \rangle \circ J_{-} = J_{-}^{\downarrow},$$

$$(S_{-}, M_{-}^{\downarrow}) \circ S_{-} = S_{-}^{\downarrow}.$$

即心阳虚、脾阴盛、肺阴盛、肾阳虚。而M<sub>-</sub><sup>↓</sup>~<sup>↑</sup>M<sub>+</sub>,

$$\begin{aligned} H_{-}^{\downarrow} &\sim \uparrow H_{+}, \\ \uparrow T_{-} &\sim T_{+}^{\downarrow}, \\ \uparrow J_{-} &\sim J_{+}^{\downarrow}, \\ S_{-}^{\downarrow} &\sim \uparrow S_{+}, \end{aligned}$$

所以还导致胆阴盛、小肠阴盛、胃阳虚、大肠阳虚、膀胱阴盛。

由上述定义可知:因为肝阳虚,所以需要升肝阳,而柴胡具有舒肝作用,故用柴胡;因为胆阴盛,所以需要降胆阴,而黄芩具有利胆作用,故用黄芩;因为 $\uparrow T_{-} \sim T_{-}^{\downarrow}$ ,所以需要升脾阳,而党参具有益脾作用,大枣具有补脾作用,故用党参和大枣;因为 $T_{+}^{\downarrow} \sim \uparrow T_{+}$ ,所以需要降胃阴,而半夏具有降逆作用,故用半夏;因为肺阴盛、大肠阳虚,所以既需要降肺阴又需要升大肠阳,而生姜具有宣肺降逆作用,故用生姜;又因为具有调和作用,所以用甘草。故肝阳虚证可以小柴胡汤治之。

中医辩证论治数学表达是中医现代化的基础和条件。只要根据阴阳五行逻辑公式体系和中药的属性与功能制作相应的计算机软件,那么上述推理过程完全可以借助电子计算机加以实现。

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groups of life power elements in Chinese herbal medicines, and as the distribution and statistical parameters of life power elements of such Chinese herbal medicines as anti-cancers, anti-cardiovascular diseases and anti-diabetes are observed quantitatively and the quantitative relationship between the effectiveness and the parameters of the said medicines are defined quantitatively, the theories of Chinese herbal medicines can be up-graded to the theoretical domains of modern chemistry so as to explore completely new theories and methodologies of the modernization of Chinese pharmacology and to further open up guiding thoughts in making prescriptions of Chinese herbal medicines for anti-cancers, anti-cardiovascular diseases, anti-diabetes and Aids.

This is the first one of the serial articles "Annotation of Traditional theories of Chinese Herbal Medicines by Theories of Modern Chemistry, Physics and Sub-cluster (quantum) Statistical Mechanics" (7 articles in total, which will be published in this journal continually). It indicates that, if all the chemical elements as the nucleus of bioactivity in Chinese medicines have to become elements conducive to life process, at least eight requirements should be satisfied. For example, they are impossible to be precipitated together with OH and a large number of Cal in human body, impossible to be over-complex with all kinds of organic acids, and acyl keto group, impossible to be excessively affined with the monomers of amino acid *in vivo*, and impossible to be over-complex with the large quantity of amidogen groups existing in bio-protein molecules of human body. In addition, the ions of the elements in Chinese medicines, which are helpful to human life, cannot have actions to SH group *in vivo*. In this article all the elements are divided into the groups of useful and toxic ones in accordance with the complex ability of metal ions and their various groups and thus primary scientific basis is provided for the analysis of the cause of diseases from the angle of elements.

**Key Words:** element, complex ability, useful element, toxic element

### Mathematical Expression of Diagnosis and Treatment Based on an Overall Analysis of Diseases and patient's Condition in Traditional Chinese Medicine

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The doctrine of Yin-Yang and five elements lays the theoretical foundation of traditional Chinese medicine (TCM) and the philosophy of them constitutes its highest level. It is believed that those problems that have not been resolved for thousands of years in the community of TCM will be able to be settled by the way of establishing the system of philosophic formulas of Yin-Yang and five elements and transform the theories of diagnosis and treatment based on an overall analysis of diseases and the patient's condition into and attribute them to mathematical problems and probe them. The famous mathematician Hua Luogeng said: "Mathematics is a strong hand and a instrument for all sciences.....When the tool of mathematics is neglected in any science, it is impossible to exactly depict the changing condition of objective things and even further impossible to deduce unknown data from known data, and the possibility of scientific prediction will be reduced or its accuracy be degraded accordingly." Therefore, the problems concerning TCM theories can surely be simplified if mathematical methodologies are used for them. As the space is limited, this article only discusses the system of the philosophic formulas of Yin-Yang and five elements, leaving out a large number of mathematic reductions. By the application of this system not only the therapies of TCM can be strictly expounded and proved so that scientific diagnosis and treatment in TCM will be philosophically proved, but also practical Chinese medicines can be found out in accordance with the asthenia of zang and fu organs of human body so that the normalization of diagnosis and treatment in TCM will become possible.

**Key Words:** philosophy of Yin-Yang and five elements, formula system, diagnosis and treatment based on an overall analysis of disease and the patient's condition

### A Discussion on Diagnosis and Treatment of SARS by Traditional Chinese Medicine

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Reviewing the Successful experience which has been achieved in the prevention and treatment of such vital epidemic diseases as epidemic encephalitis, measles and epidemic hemorrhagic fever by traditional Chinese medicine (TCM) in the past 50 years, this article holds that in accordance with the theories of TCM the focal point is not placed on the awareness of the causative agents of diseases but on the diagnosis and treatment based on the syndromes reflected from the struggle between the vital energy and the pathogenic