

Zero and Infinity:

Foundations of Spirituality or Mathematics?

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One hundred years after it first deliberated in Chicago, the Parliament of World Religions met again in the windy city during September 1993 to ponder the role of religion for the well-being of the inhabitants of this planet. It is perhaps befitting at this time to review how the notion of zero and infinity may have originated over five thousand years ago. The Sanskrit hymn (1) that elaborates the meaning of infinity is

Purnamadam Purnamidam PurnatPurnamudachyate
Purnasyapurnamadaya Purnamevavashishyate
Om Shanti Shanti Shanti

The hymn says that *Parabhamma* is full and no matter how much is taken away from it, only fullness

remains.

The synonyms of zero (1) taken from an ancient text Saankhya Nighantu (Muhurtha Darpanam) are

Akasham Gaganam Shunyam
Antariksham Marutpatham

Akasham refers to sky and *shunyam* is the most popular synonym for zero and thus even in their definitions, zero and infinity appear to be tied.

Figure 1 shows Prof. G. P. Rao's interpretation of the Riemann sphere with zero and infinity marked on the opposite sides (1). The letter *j* denotes the imaginary number. The point at zero represents the *atma* (Sanskrit for soul or the self) while the point on the opposite side of the globe represents the *param-atma* (or the almighty). The following fundamental points are worth learning from the Riemann sphere.

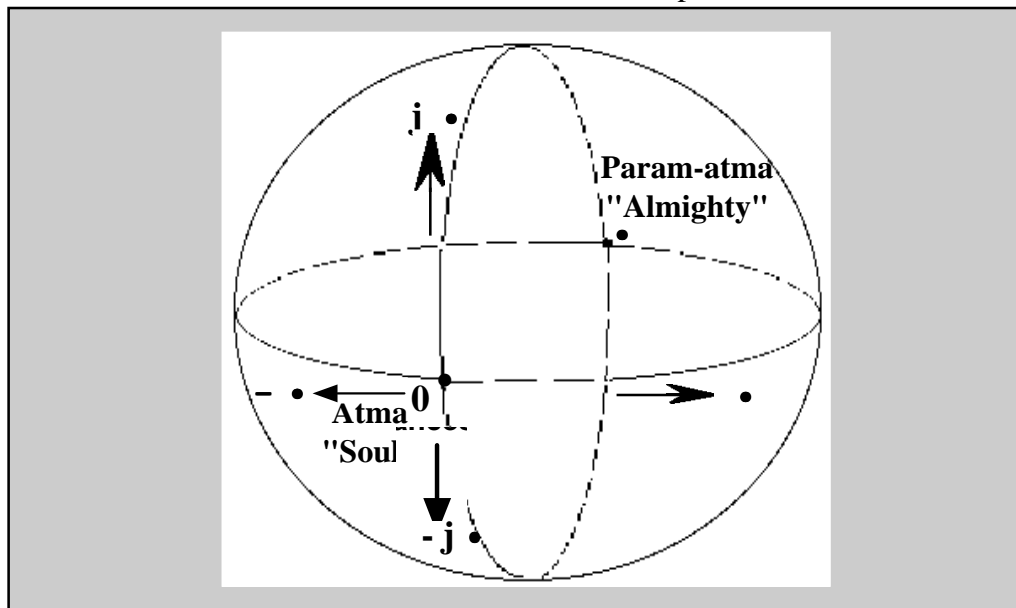


Figure 1. G. P. Rao's Riemann Sphere

1. The distance from zero to infinity is very great indeed and thus the search for the almighty is a long and difficult task.

2. The line from infinity returns to zero meaning that the search for God may be conducted within oneself.

3. One can draw a large number of radial lines from zero to infinity that eventually return to zero, meaning that multiple paths in search of God exist.

The ideas in (1) and (2) must have led great souls such as Gautama Buddha to extensive search through meditation. In this context, the search for the almighty (infinity) through meditation requires the practitioner to rid the mind of all thoughts (zero) and thus here too there appears to be a link between zero and infinity. The idea in (3) assures devotees that the routes prescribed in their respective faiths are perfectly valid approaches to achieve the desired objective, no matter how diverse the various paths may appear. Appreciation of the ramifications of these simple ideas appear to hold the key to peaceful coexistence in these troubled times. Hopefully, the reader will be impressed with the profound wisdom of the ancients.

The presence of multiple paths implies that there is no need to assume human form for the almighty, male or female. Such forms are admissible if the faithful chooses to assume them but there is certainly no compulsion for the male form.

Multiple paths lead to various faiths, such as Christianity, Judaism, Islam, Hinduism, Buddhism, Jainism, etc., each equally valid, none superior to any other. A famous verse from the three to four thousand year old *Rig Veda* says

Ekam Sad Vipra Bahudha Vadanti
(Reality is one, the wise call it by many names.)

In fact in the vedic culture certain paths are prescribed that are independent of which faith, if any, one may belong to. For example,

Karma Yoga, the yoga of selfless action, refers to realization through good deeds. Mother Teresa would be closer to realization than most of us can ever be, even if she never attended the church.

Raja Yoga, the yoga of meditation, refers to realization through discipline of the mind and the senses.

Bhakti Yoga refers to realization through intense devotion and worship.

It is interesting too what apparently began as an exercise in spirituality laid the foundations of mathematics and sciences.

ACKNOWLEDGMENTS

The interpretation of the Riemann sphere is due to Dr. G. P. Rao, Professor of Electrical Engineering, Indian Institute of Technology, Kharagpur, India. Prof. Rao has used the Riemann sphere to derive a number of interesting transforms. He also provided the Sanskrit hymn and the synonyms of zero cited in the paper.

The author acknowledges the assistance of Bharatkumar Sanghvi, a graduate student at the University of Louisville, with the word processing.

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Pradeep B. Deshpande is Professor and a former Chairman of the chemical engineering department at the University of Louisville where he also directs a Center for Desalination. He has over twenty two years of academic and full-time industrial experience. Dr. Deshpande is author, coauthor, or editor of four text books in process control and seventy papers. He has received several awards for his work including the 1990 Donald P. Eckman Award in process control education given by I.S.A. Pradeep consults for several companies in the U.S. and abroad and offers continuing education courses in several countries. He is a member of AIChE, ACS, and a Fellow of ISA.