

## Visual approach to *Rajagopuram* of a temple, a case study of Thiruvasi village, Tamil Nadu

G Yogapriya<sup>a,\*</sup>, S Suganthi<sup>b</sup> & Senthamil Kumar<sup>c</sup>

<sup>a</sup>Chettinad School of Architecture, Chettinad education and research academy, Kelambakkam, Chennai 603 103, Tamil Nadu

<sup>b</sup>Department of Architecture, <sup>c</sup>Department of Civil Engineering, Periyar Maniammai Institute of Science and Technology, Thanjavur

\*E-mail: yogapriyag@care.edu.in

Received 04 April 2023; revised 25 June 2023; accepted 02 August 2024

The perception of urban and rural environments is multi-dimensional, shaped by the individual preferences of observers, residents, and visitors. Landmarks play a crucial role in the image of a city or rural area, aiding orientation and creating memorable experiences. It enhances navigability, fosters a sense of attachment, and contributes to place identity. Monuments and heritage structures significantly influence the visual ambiance of these environments. The visibility of heritage structures depends on factors such as height, surrounding buildings, skyline, and location. Using Sketch-up software, this paper assesses the visibility of the *Rajagopuram* in Thiruvasi village, Tamil Nadu. The study evaluates *Rajagopuram*'s visibility from various distances, concluding that it is a prominent landmark that enhances visual recognition and fosters a strong sense of attachment and place identity. The study underscores the importance of preserving heritage buildings to maintain historical and cultural significance amidst modern changes.

**Keywords:** Heritage, Perception, *Rajagopuram*, Temple precinct, Visibility, Visual approach

**IPC Code:** Int Cl.<sup>24</sup>: E04H 13/00

The presence of a heritage or historical structure gives meaning to space, whether in an urban or rural setup. It enlightens us about the history of the inhabitants who lived in that area, their lifestyles, and the myths and facts associated with them. The architectural detailing, construction techniques, and building materials used exhibit the values of the past<sup>1</sup>. A perceptible indication of the historical significance of a place is attributed to its cultural identity. Such places, whether in an urban or rural setting, preserve the tangible features of history and serve as a repository for social memory<sup>2</sup>.

Conservation and preservation efforts are crucial for maintaining the logical references provided by heritage structures, which reflect the historical context of an area<sup>3</sup>. This study explores how the perceptual quality of the building enhances the aesthetic sense of Thiruvasi Village, contributing to its unique identity. The aesthetic sense gives the location a distinct identity and turns it into a visually appealing element. It transforms the site into an important sign and symbol, without which the meaning is lost, the identity is shattered, and a feeling of dislocation arises.

Numerous architects, urban design theorists, and psychologists have studied the perceptual qualities of structures and their impact on observers. This research focuses on the visibility features of the *Rajagopuram*, the entrance gateway of a Dravidian Hindu temple, within the rural heritage precinct of Thiruvasi.

The study uses Sketch-up software to analyze the visualscape of *Rajagopuram* from diverse distances. The "Visual Approach" evaluates the visibility of the structures, aiming to understand its impact on the village's environment and community identity. The analysis indicates that *Rajagopuram* serves as a crucial landmark, enhancing visual recognition and fostering a sense of attachment and place identity. Its visibility contributes significantly to the village's navigability and cultural life.

The architectural features of *Rajagopuram*, including its height and strategic location, make it a dominant visual element in Thiruvasi. By serving as a reference point, it aids in orientation and enriches the village's aesthetic and cultural landscape. The preservation of such structures is vital for maintaining the historical and cultural fabric of any rural area amidst modern developments.

\*Corresponding author

### Social and spatial adherence to South Indian temples

South Indian temples are communally suitable places for public gatherings and play a major role in everyday life. The temple's spaces are linked to the rituals performed, the culture of the people, and the climatic conditions of the region<sup>4</sup>. The temple acts as a place for social and cultural gatherings. The ornamentation in the temples has been modified by different rulers with specific architectural styles. Tanks inside the temple are used for religious activities and the tank outside the temples helps in sustaining the groundwater table. Economic Transaction is encouraged in the temple itself by accepting the offerings and redistribution of them<sup>5</sup>. In this regard, the temple complex acts as a central core.

With all its religious, social, and economical activities encompassing it, the other network streets extend along the temple complex in all cardinal directions. As depicted, the temple complex is surrounded by a network of roadways that run in all four cardinal directions (Fig. 1).

The primary access to the temple complex is dominated by the religious activities and performance of temple related rituals. It includes the processional route with chariots along the four car streets that acts as a passage for circumambulation.

The settlement along with the temple precinct creates a spatial contrast with the surrounding area when compared to the squares and plazas of the western world. It creates a vista, and a juxtaposition of positive and negative spaces. The dynamism of spaces is seen clearly in the settlement pattern surrounding the temple precinct which acts as a prominent feature.

*Rajagopuram* is prominent due to its size, intensity, and the distinctive features it retains. The delicate intricacies of the construction differ from those of

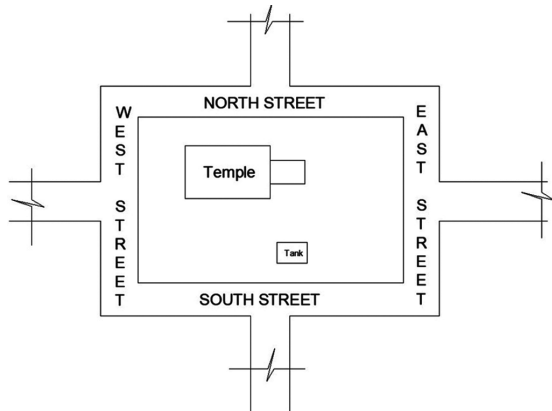


Fig. 1 — Temple Complex with Streets and Tanks (Source: Author<sup>8</sup>)

nearby structures, and the firmness conveyed through the materials demonstrates the dominant structures with their mass. *Rajagopuram* - an entrance gateway defines the realms between the outside world of humans and the internal territory of God. The solid shape of the inverted pyramid shifts the viewer's perception from the rectangular-shaped doorway to the tapering structures, causing the eye to go from the bottom to top, eventually reaching the horizon.

### Various styles of Hindu temple & Gopuram

Among the three styles of a Hindu temple named Dravidian, Nagara and Vesara, Dravidian style predominantly followed below Krishna River. The temple selected in the study is a Dravidian style one with its prominent gopuram. All the temple structure follows accurate mathematical calculation and precision in the construction.

It was believed that structures with pure geometric forms would harmonize with nature, receive positive energy from the cosmos, and spread it to the devotees. As a result, every unit in the temple has been built with exact proportions and measurements<sup>6</sup>. It is also mentioned in the literature that the gopuram structure has been derivation from a thatched roof, to bheemaratha in Mahabalipuram, which was further developed into a gopuram with intricate details, then into the massive mega structure that dominates the town or the settlement<sup>7</sup>.

The smallest unit of measurement, anu, is the starting point for the dimension. The *angula* (1.875 cm) and the *hasta* (cubit, 45 cm) are the basic units of measurements<sup>8</sup>.

Muzhakkol is likely a regional or traditional name for a measuring rod, often used in the context of agriculture. It may also relate to the measurement of length for various construction or land measurement purposes<sup>8</sup>. A "Hasta" is a traditional unit of length, typically measured from the elbow to the tip of the middle finger. It's also known as a "cubit" in English. The exact length of a hasta can vary from region to region but is generally about 18 inches (approximately 45-48 cm)<sup>9</sup>.

In traditional Indian measurement systems, a "Viral" is a subunit of length typically used within larger units. A "Talam" is equal to one quarter of the full length of a "Muzhakkol," as shown by the notation 1/4. "Vitasti" measures the span between the thumb and the little finger when outstretched. "One Nel" represents the single rice grain and "One Kishku Hasta," often simply "Hasta," describe specific lengths, with "Hastha"

commonly representing the distance from the elbow to the tip of the middle finger, also known as a cubit. These units reflect India's diverse and historically rich metrological system<sup>10</sup>.

#### Spatial organization of the temple town

Temple towns can be single centered like Madurai, Chidambaram, Tanjore or multicentered like Kumbakonam. Morphology originated with the temple core as the main central area and other cardinal streets run circumambulating the main complex in four directions (Fig. 2). The Gopuram was known as an immortal doorway in Sangham's time - 3<sup>rd</sup> century B.C since the temple plan was derived from several courts with four gates at all cardinal directions. The development of the settlements was either along or adjacent to it or expanded with this main street as a base for networking. Not only in temple towns, but also in rural regions, settlements are often developed with a temple as the central core.

#### Visual richness of a *Rajagopuram* through different views

The Gopuram is a tapered pyramid-shaped tower within the Dravidian Temple in the entrance. The Vimana is a pyramid structure like the one that sits atop Garbhagriha (the womb's abode), which is where the deity resides. The fundamental building contains a gopuram opening while the *Rajagopuram* is located at the entrance gate - a long, tapering structure with a wooden gate at the bottom. Since the early and mid-twelfth century, stone has been the most common building material. The load on the superstructure is reduced by using bricks. The gopuram features internal stairs that lead to the top level, which is used for *Mahakumbabishekam* – the ceremonial function of sprinkling water – in addition to being the entrance gate. *Salas* are the narrative of the Gopuram or

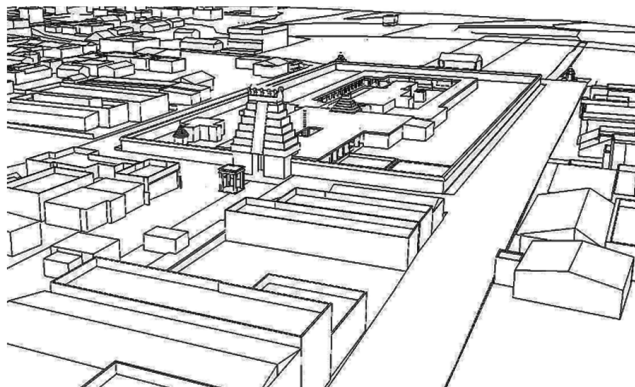


Fig. 2 — Temple Complex in a Spatial Layout (Source: Author<sup>a</sup>)

Vimana, which exhibit Hindu mythology through stories tied to the principal deity and include complex intricacies. As the tower narrows, it shrinks in size. The stories are decorated with *Haras*- a succession of shrines. The finial or *kalasa* is frequently topped by a sala, a barrel-vaulted roof in the ridge portion of tower<sup>11</sup>. Documenting is required to recognize and assess the heritage. Otherwise, there's a chance that the heritage will be lost without anyone realizing it. No one can guarantee its long-term visibility<sup>12</sup>. Various kings-built temples for worship, group meetings, and religious festivals.

#### Materials and Methods

275 regions are known as Paadal Petra Sthalam, noted in the compilation of poetry sung during 7th and 9th century in Tamil. There are approximately 275 temples categorized under this. In Tamil Nadu, there are 265 temples, with 2 in Andhra Pradesh, 1 in Kerala, 1 in Karnataka, 2 in Uttarakhand, 2 in Sri Lanka, 1 in Nepal, and Tirukayilaayam in Mount Kailash<sup>13</sup>. Among these regions, most of the places can be seen near Cauvery Delta, irrigating the fertile land of Tamil Nadu. Before selecting the village for the study, a few of the considerations have been carried out.

They are as follows.

- Location of the village near Cauveri Delta Region
- The selected villages should have sustained a population from an earlier period to this time.
- There should be only one temple in the region that has a timeline of 1000 years old.
- The temple precinct should be constructed and decorated by various kings of Tamil Regions like Chola, Pandiya and Pallavas.
- The rural heritage precinct should have 5 layers (Tala) in its Entrance Gateway *Rajagopuram*.
- The three regions are not more than 0.5 square km, which allows for efficient transit of people to and from the temple.

So, under these categories three villages have been selected.

- Thiruvasi – 0.1765 sq. km,
- Thirunedugulum – 0.2436 sq km
- Thirupazhanam – 0.2931 sq km.

The selection of Thiruvasi for this study is based on its distinct spatial configurations and integration values, showcasing varying degrees of accessibility and centrality in relation to their temple precincts. Thiruvasi, with its high integration values for roads

surrounding the temple, provides a unique case of maximum depth and connectivity.

Thiruvasi village is in the Manachanellur Block of the Tiruchirapalli District in Tamil Nadu. The population of the village is about 940 and the local language is Tamil. The geocoordinates are 10.8905304 and 78.6648452. Varadeeswarar Temple is situated in the Village has been built /expanded by various kings and it is 1000 years old. It lies in the Cauvery delta region with all its fertile land used for agriculture. The extensive area of the village covers around 0.1765 sq. km. The parts of the temple's *Rajagopuram* (Fig. 3).

1. *Kalasa* placed in a row along the ridge at the top.
2. *Sala*, a barrel-shaped oblong roof.
3. 5 *sala* offers the tapering structure a rhythmic proportion of aesthetic sense as the scale diminishes as it ascends.

4. *Adhishthana* or *pitha* – the tower is supported on a base. With a rectangular dimension of 36' by 22' and a height of 31', the main *gopuram* has 5 tiers embellished with further features on all four sides.

The primary *Rajagopuram* faces east and is situated at the entrance route with a carved wooden door, while the *Vimana* is housed in the second *Rajagopuram*, which is situated after the colonnaded *mandapam* and the *garbagriha*. It depicts the rich intricacies of stories in each layer with statues. The base map of the village is done using digitizing the google map and the four streets surrounding the temple are concentrated more and the view is studied through other streets also. The map of the village is

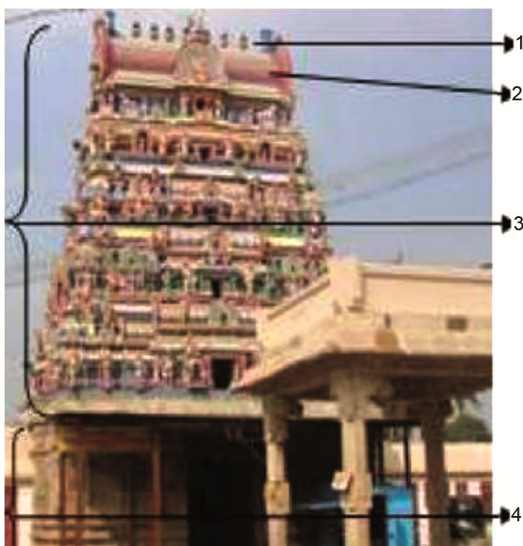


Fig. 3 — *Rajagopuram* structure of a Thiruvasi Temple (Source: Author<sup>b</sup>)

done using Autocad and it is extruded with height and details using sketchp software (Fig. 4). Research aims to capture a comprehensive understanding of the role that the landmark played in shaping local landscapes and social memories.

## Results

The *Gopuram*, as a place of worship, inspires and affects a variety of religious practices and rituals that are usually carried out in the vicinity of temples. *Gopurams* are not seen as an individual structure but as the deity itself. When people don't visit the temple for worshipping, the view of the *Gopuram* structure, inculcate the feel of worshipping the god itself. So, at any angle, seeing the structure will create a level of confidence and spiritual feeling.

A sketch up view with the structure alone has been developed to understand the view details. The results of this study indicate that the *Rajagopuram* of Thiruvasi is highly visible from multiple vantage points (Fig. 5-8) within the village, enhancing its role as a landmark (Table. 1). Specifically, the detailed architectural features, including the tiered *salas* and *kalasa*, are prominent from key viewpoints, contributing to the visual identity and cultural significance of the village. This visibility aligns with the purpose of research,



Fig. 4 — 3D view of the Temple with settlements (Source: Author<sup>c</sup>)

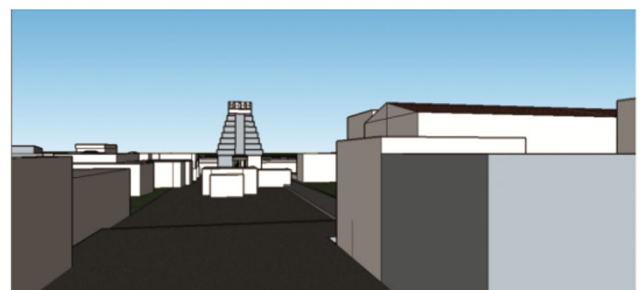


Fig. 5 — View at 80 m in the access road (Source: Author<sup>c</sup>)

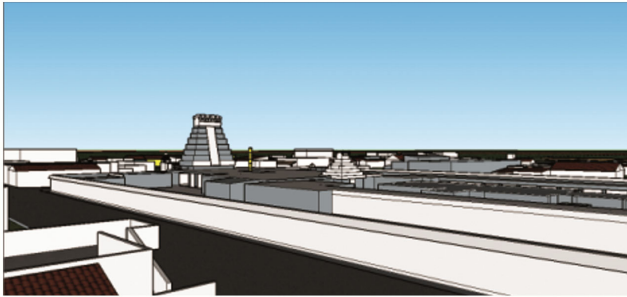


Fig. 6 — View at 80 m in the east side house terrace (Source: Author<sup>c</sup>)

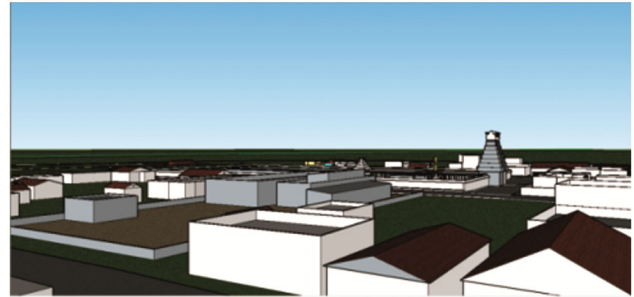


Fig. 8 — View at 80 m in the southern side house terrace (Source: Author<sup>c</sup>)



Fig. 7 — View at 80 m in the west side house terrace (Source: Author<sup>c</sup>)

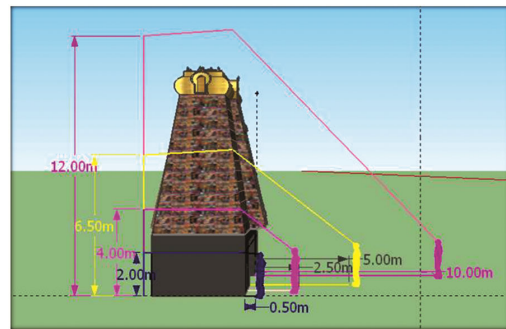


Fig. 9 — Rajagopuram seen at Shorter Distance (Source: Author<sup>c</sup>)

Table 1 — Views of *Rajagopuram* of Thiruvasi temple, with its surrounding residential units (Source: Author<sup>a</sup>)

Viewing Distance	Features Seen
View of the <i>Rajagopuram</i> in the access road at 80 m from the Gopuram at the Ground Level at a height of 2.1 m (Fig. 5)	The entire heritage structure is visible from the straight access road, unobstructed by other buildings. From nearby terraces, one can see the 5-tiered <i>salas</i> along with the <i>kalasa</i> , providing a clear and detailed view. 5 tier <i>salas</i> are seen with the <i>kalasa</i> from the nearby terrace.
View of the <i>Rajagopuram</i> from the terrace of a house at 80 m on the eastern side and height of 2.1 m (Fig. 6)	
View of the <i>Rajagopuram</i> from the terrace of a house at distance of 80 m on the western side and height of 2.1 m. (Fig. 7)	The <i>kalasa</i> is only seen from the terrace
View of the <i>Rajagopuram</i> from the Terrace of a House at 80m in Southern Side and Height of 2.1 m (Fig. 8)	From nearby terraces, the 5-tiered <i>salas</i> and the <i>kalasa</i> are clearly visible.

which is to understand the visual impact of *Rajagopuram* on the local community.

At closer distance the various parts are also visualized (Fig. 9). In that way it adds as a main identity to the village and acts as an aesthetically pleasing landmark structure with an intricate detail. Visually attractive structures or structures with landmark features would always influence the observer who perceives them. When the same building is perceived in daily life, whether it is close by or far away, a sense of belonging or connection grows over time.

To recognize and value the heritage, it is necessary to record and document it. Otherwise, there's a danger that the tradition will be lost without anyone even realizing it. No one can guarantee its long-term

visibility. In this sense, various gopuram has its impact physically, psychologically to the urban or rural space where it is located. Studying them with all their details is necessary. It is a component of religious life to go to a pilgrimage place for a special occasion. It provides a devotee with a sense of security and confidence.

**Conclusion**

The study on the *Rajagopuram* of Thiruvasi village in Tamil Nadu underscores the critical role of this heritage structure in shaping the visual and cultural landscape of the village. The research aimed to assess the visibility of the *Rajagopuram* using Sketch-up software, providing insights into its impact on the local community's identity and navigability.

The findings reveal that *Rajagopuram's* architectural features, including its tiered salas and *kalasa*, are highly visible from multiple vantage points within the village, making it a significant landmark. This visibility not only enhances the village's aesthetic appeal but also fosters a strong sense of attachment and place identity among residents.

However, the study also highlights the imminent dangers of visibility obstruction due to surrounding developments. Such obstructions could diminish the *Rajagopuram's* visual impact and its role as a cultural and spiritual beacon. Therefore, it is imperative to document and preserve these heritage structures to safeguard their long-term viability and historical significance.

The research further identifies the importance of using modern tools like Sketch-up for visual analysis. While Sketch-up effectively visualizes the structure from various distances and perspectives, the study acknowledges its limitations in capturing the intricate details and the dynamic interactions of visual elements in real-world settings.

In conclusion, preserving the visibility of heritage structures like the *Rajagopuram* is crucial for maintaining the cultural and historical fabric of regions like Thiruvashi. Future studies could benefit from addressing contemporary visual problems and exploring advanced methodologies to enhance the documentation and preservation of such invaluable landmarks.

### Acknowledgement

We would like to express our gratitude to Thiruvashi village people and Mr. Pillai for their kind support and hospitality throughout our stay in the village.

### Conflict of Interests

The authors certify that they do not have any conflict of interest to publish the manuscript in this journal.

### Author Contributions

GY has contributed to data collection, data analysis & interpretation, critical revision of the article and the final approval of the version to be published. SS has done drafting of the article. SK

has contributed to all the sketch up work and the interpretation of results.

### Data Availability

Availability of data is upon request from corresponding author.

### References

- 1 Tiesdell S, Oc Taner & Heath T, *Revitalizing Historic Urban Quarters*, (Architectural Press, London), 1996.
- 2 Carmona M, *Public Places - Urban Spaces: The Dimensions of Urban Design*, (Architectural Press, Burlington MA), 2003.
- 3 Lynch K, *The Image of the City*, (MIT Press, Cambridge, MA), 1960.
- 4 Pongomathi S, Priya R S & Sobana M S, Climate responsive design principles in Dravidian temples: A case study of Nellaiyappar temple, *Indian J Tradit Know*, 20 (1) (2021) 298-305.
- 5 Sucharita Srirangam & Forsyth W, Culture and Commerce of Chennai City – A spatial analysis of the relationship between temples and retail activity, In: Eighth International Space Syntax Symposium Proceedings, Santiago de Chile: PUC, (2012) 8120: 1-8120-27.
- 6 Bharme V & Krusche K, *Rediscovering the Hindu Temple: The Sacred Architecture and Urbanism of India*, (Cambridge Scholars Publishing), 2012.
- 7 Gift Siromoney, The Evolution of the Gopuram and the Vimanam, *Madras Christian College Magazine*, 31 (2) (1962) 78-80.
- 8 Arunachalam B, *Indian prelude to British cadastral and revenue maps*. Coordinates. Retrieved from <https://mycoordinates.org/indian-prelude-to-british-cadastral-and-revenue-ma>, 2006.
- 9 Srinivasan S, *Mensuration in Ancient India*, Available online at [https://ia804706.us.archive.org/33/items/Mensuration\\_in\\_Ancient\\_India/Mensuration%20in%20Ancient%20India%20-%20Saradha%20Srinivasan\\_text.pdf](https://ia804706.us.archive.org/33/items/Mensuration_in_Ancient_India/Mensuration%20in%20Ancient%20India%20-%20Saradha%20Srinivasan_text.pdf), 2001.
- 10 Acharya H, *Encyclopaedia of Hinduism*, The Cambridge University Press. Available online at <https://archive.org/download/encyclopaediaofh07achauoft/encyclopaediaofh07achauoft.pdf>, 1929.
- 11 Yogapriya G & Kumar S, Identifying the perceptual qualities of a heritage precinct - entrance gateway of Thiruvashi Village, Tamil Nadu, *Int J Recent Technol Eng*, 8 (3) (2019) 2630-2634.
- 12 Yogapriya G & Kumar S, Identifying the perceptual qualities of a heritage precinct - entrance gateway (Rajagopuram), *Int J Eng Adv Technol*, 9 (1) (2019) 931-935.
- 13 Prakash H, *275 Shiva Temples List – Ancient Temples of Tamil Nadu (Incredible 276 Shiva Thevara Stalanganal)*, Available online at <https://hiramprakash.wordpress.com>, (2016).