The representation of space is not a mental preconceived form. One must to consider it as a whole of technical, logical and intellectual processes that progress, not very quickly, as the historical and cultural contexts of a society change. Since the Renaissance to the Nineteenth century the representation of architectural space has crossed fundamental steps, articulated by the scientific thought and technological progress. In this field we analyze the ideas and constructions of the architects and artists that in these centuries the concepts of the science have used. The image, between science and art, opens to a research field about the representation methods of the space and also on the validity of these methods rose and developed in relation to cultural, artistic and social parameters of their time. This paper will deal with images, or better, representations to communicate ideas or tridimensional realities on two-dimensional surfaces. There is a spatial dialogue between art and science, which can be interpreted through six known examples, from the medieval geometry to the fourth-dimension. A sort of excursus of the “point of view” that can synthetically trace the history of these significant works, able to highlight the culture and scientific discoveries of the time that has generated them. From the perspective subjectivism of the “Renaissance box”, which uses the perspective as tool of representation of the Renaissance oligarchy, to the dynamic perspective of the Galileo’s telescope; from the quadraturism of the baroque scene to the reason’s space of Cartesian axes; from the accolade of the technique of Monge’s projections to the figurative vanguards for the experimentation of the fourth-dimension. To represent the space needs to think the reality shapes itself by the images that produce, as the superficial transparency, the surface of the things; the world every moment, is located in the universe of its figures; the world of representations is the world» (Guillerme 1982, p. 13). What Guillerme describes as “bordering ghosts of the reality” are the infinite possible representations of the space that, in time, correspond to the own space. Drawing, even before representing, means seeing and knowing by way of a critical method that, during the history, found its experimental and applicative field in the geometrical description of space that, first and foremost, is a mental space. The geometrical representation, already heritage of Greek empirical culture that codified it as first, in each age is considered essential on the social and scientific progress plane, so as to assume an important role in this kind of approach and in the technical and architectural evolution.

This is a wide topic of research that, between the XVII and the XVIII centuries, has been codified by Descartes and Monge with the laws of perspective and descriptive geometry. The representation of space is not a mental preconceived form. One must to consider it as a whole of technical, logical and intellectual processes that progress, not very quickly, as the historical and cultural contexts of a society change. Since the Renaissance to the Nineteenth century the representation of architectural space has crossed fundamental steps, articulated by the scientific thought and technological progress. It’s interesting analyzing until which point the ideas and the artworks made by scientists, by technicians, by architects and artists, during those centuries, as the concepts of the science have used. The image, between science and art, opens to a research field about the representation methods of the space and also on the validity of these methods rose and developed in relation to cultural, artistic and social parameters of their time.

Keywords: figurative experimentations, perspective visions, space/time.

La rappresentazione dello spazio non è una forma mentale preconistuita; bisogna considerarla come un complesso di processi tecnici, logici e intellettuali che progrediscono, non troppo rapidamente, man mano che mutano i contesti storici e culturali di una società. Dal Rinascimento al Novecento la rappresentazione dello spazio architettonico ha attraversato tappe fondamentali, scadite dal pensiero scientifico e dal progresso tecnologico. In questo contesto si analizzano le idee e le realizzazioni degli architetti e degli artisti che, nel corso di tali secoli, hanno utilizzato, e, come i concetti della scienza. L’immagine, tra scienza e arte, apre un campo di studio sui metodi, nati e sviluppati in funzione di parametri culturali, artistici e sociali propri del loro tempo. In questo contributo si tratterà di immagini, o meglio di rappresentazioni per comunicare idee o realtà tridimensionali su superfici a due dimensioni. Vi è un dialogo spaziale tra arte e scienza, che può essere interpretato attraverso sei esempi noti, dalla geometria medioevale alla quarta dimensione. Una sorta di excursus del “punto di vista” che possa tracciare in modo sintetico la storia di queste opere significative, capaci di mettere in evidenza la cultura e le scoperte scientifiche del tempo che le ha generato. Dal soggettivismo prospettico della “scatola rinascimentale” che utilizza la prospettiva come strumento di rappresentazione della oligarchia rinascimentale, alla prospettiva dinamica del cannocchiale di Galileo; dal quadraturismo della scena barocca, allo spazio della ragione degli ass cartesiansi; dall’elegia della tecnica delle proiezioni morganiane, alle avanguardie figurative per la sperimentazione della quarta dimensione.

Parole chiave: spazio/tempo, sperimentazioni figurative, visioni prospettiche.

La rappresentazione geometrica dello spazio
Per rappresentare lo spazio occorre immaginare lo spazio. Scrive Jacques Guillerme: “Qualunque sia il fondamento originario dell’atto del tracciare, l’iscrizione su di una superficie espressamente devoluta a tale uso produce, alla maniera di una trasparenza superficiale, dei fantasmi limitrofi del reale. In altri termini, il reale si trova a prender forma dalle immagini che lo descrivono successivamente, come da una superficie di carta [...]” (Guillerme 1982, p. 13). Ciò che Guillerme definisce “fantasmi limitrofi del reale” sono le infinite possibili rappresentazioni dello spazio le quali, a loro volta, coincidono con lo spazio stesso. Disegnare, ancora prima che rappresentare, significa vedere e conoscere secondo un procedimento critico che, nel corso della storia, ha trovato il suo campo di sperimentazione ed applicazione nella descrizione geometrica dello spazio che, innanzitutto, è uno spazio mentale. La rappresentazione geometrica, già patrimonio della cultura empirica greca che per prima la codificò, in ogni epoca viene rimaneggiata fondamentale sul piano del progresso scientifico e sociale, tanto da assumere un ruolo di primissimo livello nella prassi e nell’evo- luzione tecnico-costruttiva. Questa diviene un’ampia materia di ricerca che, tra il XVII e il XVIII secolo, fu regolamentata da Descartes e Monge con le leggi della geometria proiettiva e descrittiva. La rappresentazione dello spazio non può essere considerata una forma mentale preconistituita; bisogna piuttosto considerarla come un complesso di processi tecnici, logici e intellettuali che progrediscono, non troppo rapidamente, man mano che mutano i contesti storici e culturali di una società. Dal Rinascimento al Novecento la rappresentazione dello spazio fisico ha attraversato tappe fondamentali, scadite dal pensiero scientifico e dal progresso tecnologico. È interessante considerare fino a che punto le idee e le realizzazioni degli scienziati, dei tecnici, degli architetti e degli artisti, nel corso di tali secoli, utilizzano, e come, i concetti della scienza.

L’immagine, tra scienza e arte, apre un campo di studio e di ricerca sui metodi di rappresen-
This paper will deal with images, or better, representations to communicate ideas or tri-dimensional realities on two-dimensional surfaces. There is a spatial dialogue between art and science, which can be interpreted through six known examples, from the medieval geometry to the fourth dimension. A sort of excursus of the “point of view” that can synthetically trace the history of these significant works, able to highlight the culture and scientific discoveries of the time that has generated them.

First example: the perspective subjectivism of the Renaissance box

Georges Poulet in the volume Studies in Human Time talks about the great difference between the Medieval reaction and the Renaissance one to the experience of time: «For the Medieval man, then, there was not only the duration. There were many “durations” organized one on the other, and not only in the universality of the external world, but inside itself, in its nature, in its human existence. Our time’s and space’s perceptions is defined by culture, the same culture that imposes, to all who recognize themselves in it, the method to set and establish both time and space (Fig. 1). The Renaissance paradigm was based on the conviction that universe was ordered and rationed by geometric terms; a vision of the world from a static viewpoint, in according to an univocal reality, an idealized one, of all it’s around us. We can theories the perspiciere of Brunelleschi, Leon Battista Alberti, Piero della Francesca. Si configura la doppia configurazione dello spazio, e dello spazio è determinata dalla cultura, che poneva l’uomo al centro di ogni cosa, e Piero della Francesca in Studio of perspective (1483–1520).

Second example: the Galilean telescope and the dynamic perspective «Natural philosophy is written in this very wide book that endless is opened in front of the eyes, I say the universe, but it’s not possible to understand it if first we don’t learn to know the code and the character in which it is written. It is written in a mathematical code, and the character are triangles, circles and other geometric shapes, without these it’s impossible to interpret the human world; without these it’s like an outflanking in a dark labyrinth in vain». Overrated the Ptolemaic perception of the universe that placed man at the center of all, and supplanted with the Copernican revolution a new idea of space that, it was anymore focused on the center point of view, loses the reference points, the man must to plain again his spacusiousness.

The methods of representation assume the types of independent science, becoming like this fascinating object of study by some academicians and researchers of other bailiwicks. The dynamics connotation of representation of world will be the result of further researches.
The perspective science reached an important the Baroque research. The third example: the “quadraturism” and Bibiena and Canaletto (Fig. 4).

A fundamental tendency of science, in XVII century: «Cosa vi fu di tanto sconvolgente nelle scoperte astronomiche di Galileo? Egli trovò tante cose nel cielo che di conseguenza l’ordine astronomico fu molto meno rigido di quanto le persone non avessero felicemente creduto prima. Se i cieli cominciano a mostrare una tale mancanza di austerità credibilità, se rilievetevano l’inquietudine della condizione umana, chi poteva sentirsi sicuro nelle sue credenze più importanti? In tal modo la paura primitiva ispirò i furibondi attacchi che gli Aristotelici del suo tempo rivolsero contro Galileo. […] Con una tale inquietudine interiore, la vita come un tutto non diventava forse una faccenda da molto precaria?»

The times is captured inside an apparent spatial, articolato secondo un sab- cientifico; la quale esige valutazioni definitive e quantitative evaluations as a systematic parameter, like a certain parameter, in each field. A fundamental tendency of science, in XVII century, was the search of measurement and observation by means the analysis and the deconstructionism. The visual method, because its own component, produces an uniform, in- cipient and connected space, but the intense visual effort brings to the fragmentation of images, it seems that sight has the specific power to distinguish or catch single space’s views in few moments. From this, a mannerist language, full of images and means which contrib- ute to break up the unitary structure of the architectural composition of which they belong. The space and the Mannerist scene drifts to isolate the audience from the surrounding world, laying it on an independent level, in an unusual environment, richer, festive, but

The third example: the “quadraturismo” and the Baroque research.

The perspective science reached an important level of ripeness in the artistic field, when the first Academies were founded, but also the “ocular proof” Desdemona’s adultery. Finally, he achieves it, because his ruin (McLuhan 1988, p. 34). The visual, sensual perception is a necessity’s marker for the new culture that starts from the Renaissance, which requires definitive and quantitative evaluations as a systematic parameter, like a certain parameter, in each field. A fundamental tendency of science, in XVII century, was the search of measurement and observation by means the analysis and the deconstructionism. The visual method, because its own component, produces an uniform, in- cipient and connected space, but the intense visual effort brings to the fragmentation of images, it seems that sight has the specific power to distinguish or catch single space’s views in few moments. From this, a mannerist language, full of images and means which contrib- ute to break up the unitary structure of the architectural composition of which they belong. The space and the Mannerist scene drifts to isolate the audience from the surrounding world, laying it on an independent level, in an unusual environment, richer, festive, but
centrico, smarrisce i punti di riferimento, l’u- mano deve riprogettare la sua spazialità. I metodi di rappresentazione assumono ca- ratteri di scienza autonoma, diventando così appassionante oggetto di studio da parte di studiosi e di ricercatori di altre discipline. La connotazione dinamica della rappresentazione del mondo sarà frutto di ricerche successive, contributo proveniente dalla sperimentazione galileiana (Fig. 3).

Wolfgang Köhler fa un’interessante osserva- zione sul nuovo spazio sperimentato nel XVII secolo: «Cosa vi fu di tanto sconvolgente nelle scoperte astronomiche di Galileo? Egli trovò tante cose nel cielo che di conseguenza l’ordine astronomico fu molto meno rigido di quan- to le persone non avessero felicemente creduto prima. Se i cieli cominciavano a mostrare una tale mancanza di austerità credibilità, se rilievetevano l’inquietudine della condizione umana, chi poteva sentirsi sicuro nelle sue credenze più importanti? In tal modo la paura primitiva ispirò i furibondi attacchi che gli Aristotelici del suo tempo rivolsero contro Galileo. […] Con una tale inquietudine interiore, la vita come un tutto non diventava forse una faccenda da molto precaria?» Shakespeare e Bosch, ad esempio, sono due delle numerose figure rinascimentali che proclamano il loro senso di alienazione nel nuovo mondo di intensa pro- duzione di immagini frammentarie.

La scienza prospettica fu condotta nelle aule accademiche a livelli di notevole e crescente perfezione, con un’ampiazza di problemi e di appa- rature che rivelano tutto l’interesse alla ricerca e alla progettazione del- le architetture (Vagnetti 1974, p. 355). Il tempo è catturato all’interno di una spa- zialità apparente, articolato secondo un sa-
sometimes also grotesque, emphasizing in this way its imbalance state in accordance with the reality. The time and the space drift, as Hauser says, “to ‘an escape into the chaos’” (Hauser 1964). The visual impulse is repeatedly con-
tained by a screen that operates on the basis of a theater wing that, instead to be a border or a limit for the eye to catch something and stirs up the curiosity of the observer.

The Baroque can be considered as a vacation of the rhythm, a real show, or rather a come-
back to the balance and to the classical grace after the visual complications made by the
Mannerist fragmentation. The theme of the infinite, of the horror vacui combined with the amor vacui, or better, the idea of the distort representation of space (to catch an unreal time) is one of the fundamental element for poetry and for the Baroque art.

Nature as natural show in an incessant flux within which man acts at the same time as actor and as onlooker. The deep interpenetration between reality and fantasy, trickery and nature, real space and artificial space, takes advantage of the representation of graphic methods with decorative, plastic, pictorial and sculptural own of those same artists who contributed to the making of some texts and theatrical or festive set scenes. According to this, Baldassarre Peruzzi can be considered the forefather of this movement, with Giulio Romano and Andrea Pozzo.

The moment of changing was one of the fa-
vorite Baroque themes. Bernini, as we said, represents Anchise and Proserpina in the ex-
stinct moment that they have been carried away. The action looks to the both direction. Bernini celebra la grandezza e la brillanza del teatro che, invece di segnare un confine o di porre un limite allo sguardo, nasconde qualcosa ed eccita la curiosità di chi l’osserva.

Il Barocco può essere considerato una variante di ritmo, una contropuntista, ovvero un ritorno all’equilibrio e all’ostentazione classica dopo le complicazioni visive del barocco manierista. L’azione guarda in entrambe le direzioni. Bernini celebra la grandezza e la sonorità della doppia prospettiva e dei con-
trappunti barocchi (Fig. 5).

Quarto esempio: gli assi cartesiani e lo spazio della ragione

Cartesio sosteneva che l’individuo vede lo spazio non secondo l’occhio della poesia, ma secondo l’occhio della scienza e della ragione. Erano gli inizi del Seicento ed i contributi di Cartesio e Desargues costituirono la premessa su cui costruire un’altra sorta di spazio e un diverso modo di rappresentarlo, un’altra for-
ma simbolica capace di interpretare il pensiero della mutata società.

Il primo principio ad essere messo in discus-
sione dall’uomo di cultura del XVII secolo è quello di assolutoismismo (in campo etico, politi-
co e artistico). Già nel 1637, col Discours sur la Méthode, Cartesio aveva dato vita alla mo-
derna filosofia del dubbio, posta in cità e in维持 il concetto di autorità. «Di tutto posso dubi-
tare, fuorché di dubitare, cioè di pensare» è l’espressione simbolica del suo soggettivi-
simo. Il pensiero cartesiano è per primo essere, vero se non si lo riconosce evidentemente tale. Per arrivare a questo, aggiunse Cartesio, è spesso indispensabile suddividere un proble-
ma complesso in parti, ogni singolo pensiero dello spazio e lo spazio in termini numerici. Dopo Cartesio la geometria, anzi, l’intera matemati-
calca, fu nota come “Scienza dello Spazio” e del
From the iconographic point of view, an emblematic merit takes the design of the big eye of Ledoux that brings inside the theatre room of Besançon. The human being reflects inside his eye (coincident with the point of view) the image of a reality external to him. Whether the static eye of the Renaissance gave a symbolic representation of a reality in which both objects and subjects followed symmetrical relationships, the eye of the Enlightenment is figuratively expressed by the eye of Ledoux which is the centre of projection of a reversed universe compared to the one of the Renaissance. It brings the reality inside itself consulting such as a symbolic image of the modern perspicuus (Fig. 6).

**Fifth example: Monge projection and the eu- logy of the technique**

The decisive contribution of Monge to the development and codification of descriptive geometry allows the science of representation to tackle graphic solutions related to the technical description of an object in a concise and tangible way, in accordance with a correspondence between reality and image. During the Industrial Revolution, the descriptive geometry formalized graphically an answer to the need for representing the reality in a useful way in a technical reproduction. The concept of a piece of art becomes the instrument of de- veloped communication in the technical offices, made for the industry. The process of industrialization has as the highest level of worth the series: the object can be replicated in thousand of copies without losing anything of its quality, instead its value will consist in being infinitely repeatable and reversible. To accomplish such needs, the representation of the space relies to a new scientific language codified by Monge and experimented, especially in England, from scholars like William Farish. On the basis of Monge’s theory about point of view placed in the infinity and projection radius parallel between them and orthogonal or oblique compared to the projection surface, the object will be investigated by the eye of God, placed in an immeasurable distance from where you can see the universe of things. The point of view placed in the infinity, defined “improper point”, let you think on the relationship between subject and object. The first sees the universe of objects from an infinity distance, from a distance you can approach with a logical abstraction of thinking. It is interesting to remember that, at the beginning of the XX century, parallel projections became a challenging creative cue for figurative avant-garde (Fig. 7).

**Sixth example: figurative avant-garde for the experimentation of the fourth dimension**

Between the XIX and the XX century, around a couple of generations, the discoveries in physics put in discussion the known universe until that moment. It was scary to discover to live in a world in which things are rarely as they seem5. The space, in modern physics, thanks to the Albert Einstein’s theory of relativity, is conceived in relation to the changing point of view linked to the infinite spatial and temporal variations, not as the absolute entity of Newton’s Enlightenment anymore. In the modern art, for the first time from Renaissance onwards, a new idea leads to a new conscious enrichment of our ways to feel the environment. All of this found the most complete realization in the spatial research of Cubist avant-garde at the beginning of the Novecento. Milan Feltrinelli, pp. 422.


---

**Figure 6**

Claude Nicolas Ledoux, A glance on the inside of the theatre of Besançon (1804).

**Figure 7**

Claude Nicolas Ledoux, Colpo d’occhio sull’interno del teatro di Besançon (1804).

---

**Quinto esempio: le proiezioni mongiane e l’ego- logia della tecnica**

L’apporto decisivo di Monge allo sviluppo e alla codificazione della Descrittiva dievo modo alla scientia della rappresentazione di affrontare in modo sintetico e concreto le soluzioni grafiche relative alla rappresentazione tecnica dell’oggetto secondo una corrispondenza biunivoca tra realtà e immagine. In pieno clima di rivoluzione industriale la geometria descrittiva formalizzata graficamente si presenta come una risposta alla necessità di rappresentare la realtà in modo utile ai fini di una riproducibilità tecnica. Decade il concetto di opera d’arte come processo creativo di un prodotto unico ed irripetibile e, dal XIX secolo in poi, si considera il prototipo come esemplare da immettere in un sistema di riproduzione su ampia scala. Il disegno deve possedere pertanto determinate capacità atte a riprodurre l’oggetto, che non è più modello unico ma elemento seriale che l’industria è in grado di mettere in produzione. Il disegno non è più appannaggio dell’artista ma diviene strumento di comunicazione elaborato presso gli studi tecnici, finalizzato per l’industria.

Il processo di industrializzazione pone al sommo livello di valore la serie: l’oggetto può essere ripetuto in migliaia di esemplari senza perdere nulla della sua qualità, anzi il suo valore consiste proprio nell’esistere infinitamente ripetibile e riperto. Per assolvere a tali esigenze la rappresentazione dello spazio si affida al nuovo linguaggio scientifico codificato da Monge e sperimentato, specie in Inghilterra, da studiosi come William Farish. Sulla base della teoria mongiana del punto di vista posto all’infinito e dei punti paralleli tra loro e ortogonali o inclinati rispetto al piano di proiezione, l’oggetto verrà indagato dall’“occhio di dio”, posto ad una distanza irri- scindibile da cui guardare l’universo delle cose. Il punto di vista posto all’infinito, definito “improper point”, let you think on the relationship between subject and object. The first sees the universe of objects from an infinity distance, from a distance you can approach with a logical abstraction of thinking. It is interesting to remember that, at the beginning of the XX century, parallel projections became a challenging creative cue for figurative avant-garde (Fig. 7).

**Sesto esempio: le avanguardie figurative per la sperimentazione della quarta dimensione**

Tra il XIX e il XX secolo, nel giro di alcune generazioni, le scoperte della fisica avevano
the beginning of the century. «The XIX century discovered the light, the one of the Impressionists and the photgraphers; at the end of the century, to avoid a dispersion of the coloured shape, painters recovered the sense of construction: Seurat and the Neo-impressionists through the density of point of colour, Gauguin and Nabis with the clear outline of shapes. However, in both cases, the problem remains limited to the two dimensions of the plane. [...] Passing from the three dimensions of the nature to the two dimensions of canvas had always been the biggest ambition of every painter: this is the impossible challenge that every artist wants to try and that seemed finally resolved from the coming perspective in the Renaissance: actually it wasn’t a stratagem, an appearance, an imitative illusion. When painting becomes a geometric projection on a vertical surface, it was like a reflex in a mirror. The reality that it wanted to gain was purely external and the artist can’t catch it, like an illusion. The century, which begins under the double sign of science and technique, wants to be exact, accurate, and rejects all the expressions from the traditional past, the conventions of convenience, for discussing all the problems again, starting from postulates. [...] The modern artist doesn’t care about representations; he wants to find the inner truth of things and the system that tries it. So he is inclined to translate impressions (colour and shape) of nature in symbols, visible signs and representations of concepts and, consequently, rationalizing his vision. This approach goes beyond the criterial of a school or style and, from this point of view, it belongs both to fauvists and Cubists; it is an ethics more that an aesthetic, because a certain way to see – and this is owed to cubists – implies a certain manner of being10.

As example Seurat, during his path of artistic training, used the Newtonian analysis of the fragmentation of light, reaching the technique of divisionism, with which every point of colour becomes the equivalent of a real light source, like the sun. This expedient inverted the traditional perspective making the point of view – the eye of the observer – opposite and equivalent to the accidental point – the object is represented according to a pointillist technique. To the contributes of the impressionists, the cubists and the futurists, you can attach the radical change of perceiving and representing the architectural space and the object put in it. The measure of time, related to the science and the representation of the space, changes referring to the events that occur, consequently every knowledge of space and time takes a relative aspect against the phenomenon investigated11. The masters of De Stijl, with the axonometric vision, represented compositional elements that are entangled from every context. So, the object is seen in every part and, with strict clarity, it denounces, with its coordinates related to the projection surfaces, the dimensional data, the materials which form it and eventually – in axonometric exploded – the system of construction and serial assembly12 (Fig. 8).

Some notes about fourth dimension: in 1913, in his work Peintres cubistes, Apollinaire claimed that "geometry is to plastic art as grammar is to writing. [...] Today scientists don’t deal with three dimensions of Euclidean geometry. Painters have been leading naturally and, to say that, intuitively, to worry about new possible measure of the space that, in the figurative language of moderns, are denoted together by the term fourth dimension. So, as it offers the spirit, from the plastic point of view, the fourth dimension should be generated by the three known dimensions: it represents the immensi-
ty of space that manifests itself in all directions in a determinate motion. The space itself, the dimension of infinity, gives plasticity to the objects. And also, a year before Apollinare, Gleizer e Metzinger claimed: «if you want to link the space of painters to some geometries you need to refer to non–Euclidean scholars, think hardly some Riemann theorems»13. The study of perspective always allowed with its theories, a fixed point of view as a monocuclear visual fact, even if the observer has a sensation of a single image through both of the eyes. This leads us to consider the concept of relativity between something that must be represented and the observer status stationary or in motion (Fig. 9).

The concept of linear perspective, in its easiest applications, still remains a conventional reference; so we must watch to this point of view as a mobile perspective, as well as the space around us is in motion, and we must investigate with which instruments we can express the need of movement.

During first years of XX century, figurative experimentations of the artistic avant-garde, painting and also architecture, are undertaken to transmit the impression of such movement. We arrived, in this way, to the concept of shape decomposition in its natural and primary elements, giving to the observer the task of mentally rework already investigated in its movement. The point of view charges and becomes the sum of all the forces in motion that give life not only to the subject but also to the objects which the represented imaginary is made of14 (Fig. 10).

Figure 9
Ettore Sottsass, Study for a residential building, isometric (1950).

Figure 10
Pablo Picasso, Guernica, the detail of woman (1937).

13. Quotes are taken from the book: De Micheli, op. cit., cap. 7.