Critical review of studies on the representation of architecture and use of the image in science and art

Rassegna critica di studi sulla rappresentazione dell’architettura e sull’uso dell’immagine nella scienza e nell’arte

TEXTURES, THEMES AND FIGURES OF GEOMETRIC PATTERNS

TRAME, TEMI E FIGURE DEL TRACCIATI GEOMETRICI

The construction of a discourse appears in the infinite plots of thought that form and measure the space of the mind. The logic of a reasoning thus appears, as an image. It is like an image that appears in the endless plots that represent the thought of the mind.


La costruzione di un discorso appare nelle infinite trame del pensiero che formano e misurano lo spazio della mente. Appare così, come un’immagine, la logica di un ragionamento. Come un’immagine che appare nelle infinite trame che rappresentano il pensiero della mente.


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Fashion wefts and geometries of design

Massimiliano Ciammaichella

The combination of fashion and transformation frames a current reality where the subjects and their dressing practices are the objects of processes of a constantly mutating identity building. At the centre of the debate on fashion design there is always a human body which interacts and co-exists with the technologies that inhabit it: they, at the same time, amplify the range of forms and operational possibilities based on the most advanced representation methods and prototyping of clothing and accessories, relating to innovative materials. The paper reflects on the modes of construction of the artefacts and on the methods of planar development of patterns, needful for the making of clothes and accessories, and at the same time investigates the inspiring principles of projects that relate with wefts traced directly on real bodies, or on their digital clones. The main case studies here presented concern the work of fashion designers and creative directors who experiment with digital technologies during the ideation, design, pattern making and prototyping phases, up to the visual communication of fashion garments and accessories. A complex kaleidoscope of free forms that fit moving bodies, in patterns and geometries that merge with the physicality of the subjects, and sometimes deny it, demonstrates that representation, in all its knowledge, is crucial in the fashion industry.

Keywords: human body, pattern, surfaces.

In the fashion project, the human body is at the same subject and object of measurement. It is at the centre of experimenting constructive models of garments that translate the possible different clothing lines, introduced by the drawing of a croquis, on a silhouette which assimilates the features of an idealized corporeality, suggested by a moodboard, assembled in a photographic collage, or traced by means of a set of signs and therefore designed. The in-depth knowledge of its symmetrical features, therefore, draws from the observation of anthropometric canons to standardize the most suitable geometric rules to tailor a custom-made garment, by means of signs, impressed on the bodies or on the dummies, that become true sartorial lines.

Historically, the evolution of cutting methods has gone hand in hand with the development of measuring tools, starting with the use of the tailor’s hand that in the seventeenth century has gone hand in hand with the development of cutting methods. Dummies, that become true sartorial lines. Historically, the evolution of cutting methods that the tailor’s hand that in the seventeenth century has gone hand in hand with the development of cutting methods. Dummies, that become true sartorial lines.

Charles James (Sandhurst, 1906 – New York, 1978) was one of the most influential fashion designers in the United States of America. He liked to define himself as ‘sartorial structural architect’. From these premises, pattern making appearing does nothing but emulate – while forcefully reducing on plane the skewed surfaces of the body – a second skin rationalized by a set of constant slope surfaces to sew. In fact, many fashion designers are very familiar with this practice, to the point that they also use them for the design and production of the dummy.

For example, in the revolutionary work of Charles James, the continuous section of female sculptural models, obtained with planes orthogonal and parallel to each other, allowed him to extract the main construction lines of the dress designed on a set of dummies, produced by himself. The first step was carried out in the drawing of the intersection with a body that were perfected between the nineteenth and the twentieth century, giving rise to a multitude of interpretative schemes in the tracing of the pattern, whose rules are simplified in the proportioning of sets of quadrilateral or triangular modules, in order to regulate the complex free-form surfaces of the human body, to which these planar surfaces must adapt.

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hypothesical plane of symmetry, empirically obtained with a plumb line tied to the mod- 
el's neck, followed by the lines of the waist, breast and hips, to construct the true pattern 
of the chosen human body: a sort of very 
tight muslin dress, to be stiffened with strips of 
glued and layered paper, so as to prepare a rigid 
armor to be cut along shoulders and 
hips, in order to obtain two rigid casts of the 
front and back of his 'inspiring muse'. These 
than had to be rejoined, coated with impalpa- 
ble layers of wadding and covered again with 
twill fabric. The result was a tailored dummy 
that showed the marks of the main measure- 
ment traces (fig. 1).

Therefore, the mould of the human body was 
subjected to subdivision processes aimed 
identifying the main geometric–constructive 
traces of the garment, reducing them to a set 
of graphic signs marked directly on the mo- 
tionless prototype of the chosen model.

The innovative forms introduced during the 
fifties, which James called Jennies, represent- 
ed the ideal model of a feminine American 
body, slender and with a narrow waist. More 
generally, the ability to feed the desire of a wid- 
er audience is explained by the same rigorous 
procedure adopted by the couturier, whose 
synthesis is reflected in his assertions: “The sculpting of a new ideal dress form based on my 
favorite client’s figure to increase the me- 
sure of a wider audience. Coco Chanel, e.g., 
did not draw the croquis and even patterns, 
fitting upper its figure to increase the me-
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de Cir. GNOLI 2005, pp. 34–40.
7. Famous fast fashion companies, e.g. H&M and 
Zara, present new collections 
every 15 days.

Fig. 1 Reconstruction of dummy 
designed by Charles James, 3D modeling and rendering, 2019. © The author.
ers to define a body that reflects the present time, bringing it back to a reference anthropomorphic model capable of breaking free even from the two consolidated and restrictive gender tags, because the identity card registered by fashion is constantly rewritten and the garment supports it, splitting the individual's sexuality from the identity image chosen from time to time.

In this sense, fashion is a powerful stimulus of cultural subversion, where the silhouette can embody the feminine and masculine forms in a unitary way. For Maria Luisa Frisa, “masculine and feminine are not just genders that identify two different physicalities and mentalities, but must be understood as clothing attitudes which no longer imply a division between the sexes or their differences, but instead mix the characteristics of both to arrive at a new definition of a-sex: a gender that, far from being uni-sex, mixes opposite characters, and dresses a body that culturally loses the attributes of a gender itself” 9.

The problems here involved, in terms of assumption of fit models, are reflected both in the design drawing and in the execution of the garments, assembled and sewn on physical prototypes that must respond to the variables of size development. However, today’s CAD systems dedicated to fashion design’ allow to model garments and accessories on customizable 3D avatars, simulating the physics and drapery of fabrics in real time.

In this operational context can be situated the work of young designers such as Rickard Lindqvist and Jimmy Herdberg, founding members of Atacac 10. A clothing brand they created is just a piece of cloth that dresses the body, in rigid pose (fig. 2). The textile and the body in motion, on the other hand, impose design strategies starting from a careful analysis of the fit of a single rectangular fabric module that historically have diversified the costumes of some ethnic groups, ranging from the sari to the Indian dhbôti, up to the Arabian hajk even before the introduction of the art of tailoring.

The methodology introduced by Rickard Lindqvist, in his kinetic garment construction 11, interpolates the practices of draping the fabric directly on the bodies — typical of the moulage — with the rules of pattern making: in the first case the pattern is derived from the spatial modelling of textiles, wrapped and knotted to the body, that only in the last phase are subject to cutting operations; in the second case the procedure is reversed and two-dimensional patterns, to be sewn or unified, are translated into the complex volumes of the clothing. In the specific design attitude of Lindqvist, however, the rules of pattern making engage with the geometries of a rectangular module of fabric, where to draw a central elliptic curve and two segments AB and A’B’, to be cut and arranged on a 3D avatar simulating its draping through advanced cloth simulation algorithms. The planar pattern is thus converted into a mesh surface whose triangular faces collide — following the characteristics of entrambi arriving to a new definition of a-sex: a genre that, unlike the one that always is a masculine or a feminine one, can be considered a-sex, because the infinite mutability of the human body cannot be defined as a gender itself.”

The problems of fit modelling, in terms of as-
sertion of the development of garments, are translated into the complex volumes of the clothing. In the specific design attitude of Lindqvist, however, the rules of pattern making engage with the geometries of a rectangular module of fabric, where to draw a central elliptic curve and two segments AB and A’B’, to be cut and arranged on a 3D avatar simulating its draping through advanced cloth simulation algorithms. The planar pattern is thus converted into a mesh surface whose triangular faces collide — following

le caratteristiche di entrambi arrivando a una nuova definizione di a-se: un genere che, lungi dall’essere basico, mescola caratteri opposti, e veste un corpo che culturalmente perde gli attributi del genere stessos 8. Le problematiche che ciò comporta, in termini di assunzione dei modelli di vestibilità, si riflettono tanto nel disegno di progetto quanto nell’esecuzione dei capi, assemblati e cuciti su prototipi fisici che devono rispondere alle variabili di sviluppo delle taglie. Tuttavia, gli ocierini sistemi CAD dedicati al fashion design permettono di modellare capi e accessori su avatar 3D personalizzabili, simulando la fisica e il drappeggio dei tessuti in tempo reale.

In questo ambito operativo si muove il lavoro di giovani designer come Rickard Lindqvist e Jimmy Herdberg, soci fondatori di Atacac 17. Un marchio di abbigliamento da loro stessi definito come gender-free, proprio perché le infinite mutevolenze del corpo umano non sono riconducibili ad uno standard di taglie univoci e calzanti ogni singolo soggetto.

Ad essere messi in discussione sono i tradizionali metodi di disegno di un cartamodello costruito su una matrice sartoriale fatta di moduli quadrilateri, riportando nel piano il sistema di misure verticali e orizzontali prese a contatto dello stesso soggetto, in posa rigidà, che ci sottopone (fig. 2). Il tessuto e il corpo in movimento, invece, danno le strategie di progetto a partire da una attenta analisi delle forme di vestibilità di un solo modulo di tessuto rettangolare che storicamente hanno diversificato i costumi di alcuni gruppi etnici, spaziando dal sari al dhbôti indiano, all’hajk arabo ancor prima dell’introduzione dell’arte del taglio sartoriale. La metodologia introdotta da Rickard Lindqvist, nella sua indossabile costruzione cinematica, interpola le pratiche di drappeggio del tessuto direttamente sui corpi — tipiche del moulage — con le regole della modellistica: nel primo caso il cartamodello si ricava dalla modellazione spaziale di stoffe, avvolte e annodate al corpo, che solo in ultima istanza vengono sottoposte ad operazioni di taglio; nel secondo si assiste alla procedura inversa e sono i parametri dimensionali, da cucire o unificare, a farci carico delle complesse volumetrie dell’as-

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L’intero di ripercorrere alcune tappe dell’iter procedurale del designer e ricercatore svizzero, si può iniziare da un modulo rettangolare di tessuto nel quale tracciare una curva ellittica centrale e due segmenti di retta AB ed A’B’, da tagliare e adagiare su un avatar 3D, simulandone la cattura attraverso avanzati algoritmi di cloth simulation. Il piano del cartamodello, alla pari del concept design, si interseca con una serie di rette che caratterizzano un algoritmo che, al momento della creazione di un avatar 3D, deve essere in grado di generare una retetriangolare, che, in base a un modello di taglio fornito, può essere utilizzato per la creazione di modelli progettuali che, in termini di esposizione di unogenitalità e dellesu causativa, possono anche differenziarsi a seconda del contesto.}

8. FRISA 2015, pp. 136–137.
15. FRISA 2015, pp. 136–137.
the trajectories of their normal – with those of the numeric model of the digital clone of the body which, conventionally, assures the rectilinear pose with arms raised, to facilitate its adaptability according to the specific physical characteristics of the textile16, chosen from special libraries (fig. 3). By sewing the two aforementioned edges, we obtain a sort of small cape that rotates around the neck, positioning the seam line along the right arm, then we subtract two triangular portions CDE and C’DE’, the purpose is to join the pairs of segments CD with C’D’ and DE with D’E’, to obtain the three-quarter sleeve worn by the right arm, while for the left we proceed with a further straight cut at the height of the shoulder and we check the fit of the garment in its simulation. Finally, we proceed with a further triangular subtraction and then join the segment pairs FG with F’G’ and HG with H’G’. The outcome is an asymptomatic blouse, obtained from a single fabric module, whose chosen texture maintains continuity solutions also along the stitching of the edges (fig. 4). The art of tailor cut is combined with the construction logics typical of dressmaking, thanks to multidisciplinary forms of collaboration between the two branches, such as it happens in the work of Iris van Herpen and Craig Carter, project director of the exhibition Athlete. Boston Museum of Fine Arts, Boston 2013. (https://commons.wikimedia.org/wiki/File:Neri_Osman-Vanni_Herpen_Show.jpg © Neri Osman).


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Massimiliano Ciammaichella – Fashion wefts and geometries of design

Massimiliano Ciammaichella – Trame di moda e geometrie di progetto


L’esito conclusivo è una blusa asimmetrica, ottenuta con un solo modulo di tessuto, la cui manica tre quarti mantenesse le soluzioni di continuità anche lungo i profili delle cuciture (fig. 4).

Ma che “l’essenza del tailoring è la simulazione della forma scultorea della tessitura con le sette mani del design, che alla ricerca di nuove soluzioni si avvale di calcolatori, di programmi digitali, di strumenti digitali per creare vestiti virtuali che possono essere utilizzati per la progettazione e la produzione di abiti. Il tailoring, in altre parole, è una attitudine di pensiero, una tecnica, un modo di lavorare che richiede una conoscenza di tecnologie avanzate, ma che alla fine è una questione di creatività e di intuizione.”

Indipendentemente dal prolifere sul mercato di software orientati principalmente alla confezione, i progettisti di moda ricercano ne gli strumenti di rappresentazione digitale, ad ampio raggio, le traiettorie per giungere alla corretta prototipazione di abbigliamento che in diversi casi sono concepiti grazie a forme di collaborazione multidisciplinari, come ad esempio accade nel lavoro dell’olandese Iris van Herpen16, il cui immaginario ibrido le complesse geometrie della natura con l’avanzata tecnologia invita nella ricerca di materiali innovativi. La stampa 3D, a sinterizzazione laser, provvede alla prototipazione di componenti elastici e traspiranti, da cucire manualmente.

Sono involossi saggionati sui corpi e costano di superfici sghembe a doppia curvatura, del tutto avulse dalle logiche dello sviluppo piano della modellistica17, laddove il flusso dei fasci luminosi, che colpisce e attraversa gli oggetti, individua la geometria per la costruzione di nuove idee della modellazione primavera-estate Voltage del 2013 e si manifesta nel disegno di due outfit nei quali la modellazione parametrica con algoritmi generativi18 si sviluppa nelle superfici di suddivisione dei modelli che interagiscono con le macroscopiche strutture calcaree dei coralli marini (fig. 5).


through the use of software\(^8\) which allows to indicate edges of subdivision of the numerical model, to generate numbered patterns reproducing the different batch lines upstream and downstream, as to easily reconstruct a paper maquette to rework (figgs. 6, 7).

In the fashion designers practices the triangular module, taken as generator of the spatial tessellation of the garment, is recurrent and has a long history, e.g. the rigid metallic polyhedrons of the Paco Rabanne fashion collections in the Sixties, up to the triangular and square elastic patterns that alternated the silhouettes presented by Yohji Yamamoto at the Paris Fashion Week Spring 2004.

The examples are many and they all tell of ways of regimenting the body's posture or freezing its movement, even in the design actions that distinguish the work of the young British fashion designer Gareth Pugh.

The theatricalization in the staging of the dressed body permeates his work as much as his eminent storytelling, since the traditional runway show – the parade of bodies dressed by mannequins\(^7\), whose French name translates the Italian word manichino – has by now been supplanted by the performance events of the fashion show.

The meaning of these words explain the reasons of a radical change of course between splitting and reunification of the neutral terms: body, model, subject; consequently, the storytelling of the outfit becomes increasingly dependent on the actor who lives in it, so in the spring-summer collection 2007 Gareth Pugh, has taken advantage of technology to “harness the transformative potential in both bodies and material objects in order to imagine a radically open future in which we become attuned to our bodies and to the world in entirely new ways”\(^8\). But the need to translate one’s own perception into forms of clothing affinity, constrains the aesthetic signs to cuts and volumes rigorously extracted from sartorial pattern making (fig. 9). In conclusion, we have seen that for the fashion designers such as Alexander McQueen, Rei Kawakubo, Hussein Chalayan and finally Gareth Pugh, have taken advantage of technology to “harness the transformative potential in both bodies and material objects in order to imagine a radically open future in which we become attuned to our bodies and to the world in entirely new ways”\(^8\). But the need to translate one’s own perception into forms of clothing affinity, constrains the aesthetic signs to cuts and volumes rigorously extracted from sartorial pattern making (fig. 9).

bodies, Stephen Seeley underlines that the young fashion designers as Alexander McQueen, Rei Kawakubo, Hussein Chalayan and finally Gareth Pugh, have taken advantage of technology to “harness the transformative potential in both bodies and material objects in order to imagine a radically open future in which we become attuned to our bodies and to the world in entirely new ways”\(^8\). But the need to translate one’s own perception into forms of clothing affinity, constrains the aesthetic signs to cuts and volumes rigorously extracted from sartorial pattern making (fig. 9). In conclusion, we have seen that for the fashion designers such as Alexander McQueen, Rei Kawakubo, Hussein Chalayan and finally Gareth Pugh, have taken advantage of technology to “harness the transformative potential in both bodies and material objects in order to imagine a radically open future in which we become attuned to our bodies and to the world in entirely new ways”\(^8\). But the need to translate one’s own perception into forms of clothing affinity, constrains the aesthetic signs to cuts and volumes rigorously extracted from sartorial pattern making (fig. 9).

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Practical artigianali degli assemblamenti anche nella ricerca geometrica di forme di vestibilità che richiamano l’estetica dei modelli numerici. Ad esempio, la linea 3D di Standard è un marchio registrato da Issey Miyake, per il quale l’abito può essere trattato alla stregua di un poliedro a facce triangolari che vengono tirati per continuo, fino ad adottare piccoli origami fatti di tasselli sovrapposti, riconducendo le sue volumetrie alla bidimensionalità del piano. Un gruppo di ricercatori del Reality Lab, italiani manichino – sia stata oramai soppian- tata dagli eventi performativi dei fashion show. I significati delle parole esplicitano le ragioni di un cambiamento di rotta radicale fra scissio- ne e riunificazione dei termini neutri: corpo, modello, soggetto, di conseguenza il raccon- to dell’abito diventa sempre più dipendente dall’attore che lo abita, così nella collezione primavera-estate 2007 Gareth Pugh focalizza il proprio linguaggio visivo nell’assecondare l’iden- tità di un corpo feticcio, la cui pelle e il volto sono completamente rivestiti di lattice nero. Gli abiti, invece, diventano rigidi armature protettive che vincolano la postura e i movi- menti dei soggetti che li abitano. Quindi l’e- stetica del corpo reale si confronta con la smi- suratezza programmata da un clone digitale che lascia tracce di sé nelle vestigia dei modelli numerici che lo connotano, materializzandosi in poliedri vinilici (fig. 8).

Figura 6
Mezz-top, modellazione 3D e rendering, 2019. () L’autore.

Figura 7
Mezz-top, sviluppo dei pattern bidimensionali ed assemblaggio del prototipo in carta, 2019. () L’autore.

\text{wiki/File:Garethpugh09.jpg} \text{© Rebecca Cotton.}

Figura 8
\text{commons.wikimedia.org/wiki/File:Garethpughb4.jpg} \text{© Rebecca Cotton.}

18. See e.g. Pepakura Designer 4.1.6, released version May 29, 2019 [https://tamaosfi.co.jp/]
\text{pepakura-en].}

19. Mannequin: The French term identifies both the feminine and masculine gender.

20. SELLY 2013, p. 251.

cui denominazione francese traduce la parola italiana manichino – sia stata oramai soppi- tata dagli eventi performativi dei fashion show. I significati delle parole esplicitano le ragioni di un cambiamento di rotta radicale fra scissio- ne e riunificazione dei termini neutri: corpo, modello, soggetto, di conseguenza il raccon- to dell’abito diventa sempre più dipendente dall’attore che lo abita, così nella collezione primavera-estate 2007 Gareth Pugh focalizza il proprio linguaggio visivo nell’assecondare l’iden- tità di un corpo feticcio, la cui pelle e il volto sono completamente rivestiti di lattice nero. Gli abiti, invece, diventano rigidi armature protettive che vincolano la postura e i movi- menti dei soggetti che li abitano. Quindi l’e- stetica del corpo reale si confronta con la smi- suratezza programmata da un clone digitale che lascia tracce di sé nelle vestigia dei modelli numerici che lo connotano, materializzandosi in poliedri vinilici (fig. 8).

Seguendo il filo analogico di questo tipo di operazioni e interrogandosi sulle modalità con le quali la moda trasforma e progetta i corpi, Stephen Seeley nota come designer del cali-
ion designer the bodies become objects on which to experiment signs and paths that generate the construction of clothes, reflecting the imagination imposed by the inspiring principle of an entire collection, or configured as unique experiences: in both cases the knowledge of geometric rules is an indispensable condition for the success of the project. For some fashion designers, the relationship established between the subject and the object that covers it is so symbiotic that it confuses the instrumental reasons of one in the other, but in the end the same concept of plot/weft, in its dual constructive meaning of narration and warp, finds in the fashion design project its own origins manifested in the play of relationships established between the needs of being scientific, typical of drawing, and the narration of its results written on a living body in motion.

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