Bianchi Type V Magnetized Stiff Fluid Models in Lyra Geometry

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ABSTRACT

F.I.V. Edoardo Bianchi S.p.A., commonly known as Bianchi ([ˈbjaŋki]) is the world's oldest bicycle manufacturing company in existence, having pioneered the use of equal-sized wheels with pneumatic rubber tires.[1] The company was founded in Italy in 1885 and in addition to bicycles it produced motorcycles from 1897 to 1967. In 1955 the joint-venture Autobianchi was created together with Fiat and Pirelli for the manufacturing of cars – Autobianchi was subsequently sold to Fiat in 1969.Throughout its modern era, Bianchi has been associated with the Italian Giro d'Italia and Tour de France winners, Fausto Coppi,[2] Marco Pantani and Felice Gimondi. Edoardo Bianchi, a 21-year-old medical instrument maker, started his bicycle-manufacturing business in a small shop at 7 Via Nirone, Milan in 1885. Bianchi pioneered the front-wheel caliper brake. Since May 1997, the company has been part of Cycleurope Group, which is owned by the Swedish company of Grimaldi Industri AB. Bianchi and Ferrari announced in July 2017 a partnership to produce a new range of 'high-end' models. The SF01 was their first collaboration bike.[3][4]One of his first developments was to make the front wheel smaller and use the chain invented by Frenchman Vincent to reduce pedal height. In doing so, he created a safe and modern bicycle. Compared to its predecessors, it was much easier to drive because it was easier to balance. He continued to improve the bicycle and developed a construction with wheels of almost the same size. In 1888 he made the first bicycle with Dunlop tires.In 1888 Bianchi moved to a larger shop on Via Bertani. It came into contact with John Boyd Dunlop and Giovanni Battista Pirelli, whereupon pneumatic tires were introduced as bicycle tires.[5]As early as 1890, the next move to larger rooms on Via Borghetto was necessary. Series production began here. In 1895 he built the first women's bicycle for Queen Margaret of Italy. At the same time, he began using his bicycles at sporting events to test new technical developments.[6]In 1897 tests began on a bicycle with an auxiliary motor. A De Dion-Bouton built-in motor was mounted in front of the bicycle handlebars and drove the front wheel.[7]

KEYWORDS: *magnetized, bianchi, type V, stiff, lyra, geometry, fluid, model, magnetic, gravitation, scalar*

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INTRODUCTION

The Bianchi reputation began when the company sponsored Giovanni Tommasello, the winner of the Grand Prix de Paris sprint competition in 1899. Fifteen years later it was making 45,000 bicycles, 1,500 motorcycles and 1,000 cars a year. In 1935 Bianchi sponsored Costante Girardengo, one of the first Italian stars on the road, and its bicycle sales rose to 70,000 a year.[11] In 1950 Fausto Coppi won the Paris–Roubaix on a Bianchi equipped with what was later named the Campagnolo Paris–Roubaix derailleur gear, for which Bianchi bicycles featured the necessary special drop-outs until 1954.[1,2] He won the race by two and a half minutes on a bicycle equipped with Universal brakes, Bianchi steel handlebars and stem, a Regina chain and a four-speed freewheel with shaped teeth. It also had Nisi rims, Campagnolo hubs and Pirelli tyres. It was made for sale only in 57 and 59 cm, smaller than the bike that Coppi used.[2] A variation known as the Campione Del Mondo followed Coppi's win in the 1953 world championship.Riders of different eras have been associated with Bianchi including Felice Gimondi, who continues his association with the company.[11]

LUIGI BIANCHI

Recent riders include Danilo Di Luca, Mario Cipollini, Gianni Bugno, Laurent Fignon, Marco Pantani, Moreno Argentin and Jan Ullrich. Until 2007, Bianchi was a cosponsor of the UCI ProTour team, Liquigas. It did not supply teams from 1959 to 1964 nor from 1967 to 1972.[12] In October 2011, for the 2012 season, it was announced that Bianchi had been signed to a two-year deal to co-sponsor and supply bikes to the UCI [3,4] ProTeams Vacansoleil–DCM[13] and Androni Giocattoli–Venezuela. These sponsorships continued in 2013 and for 2014, with Vacansoleil–DCM ceasing to exist, Bianchi again supplied Androni Giocattoli–Venezuela for a further year, and the then new Belkin Pro Cycling team. In 2015, the latter became LottoNL–Jumbo and Bianchi's only UCI Pro Continental sponsored road team.[14]The most demanding rider may have been Pantani. Sara Mercante, head of Bianchi's research and development, said: "Pantani had very specific ideas about what he wanted. He had 30 different frames a year from us—with different angles and weights on each one. He changed his bike after every ride. I'd go and meet him during the Giro d'Italia and the Tour and discuss improvements with him. He'd ask to have the geometry changed by, say, half a degree, just to make sure the bike was absolutely perfect. [5,6]He'd want different angles for different races. He's ask us to tweak the length of the top tube by a millimetre or by half a degree. Pantani was quite obsessive."[15]

Bianchi is currently headed up by CEO Bob Ippolito, who before joining Bianchi was the Executive Vice President and General Manager of Pacific Cycle, headquartered in Madison, Wisconsin.

Bianchi bicycles are traditionally painted Celeste, a turquoise also known as Bianchi Green, (and sometimes, incorrectly Tiffany Blue, a trademarked colour).[7,8] Contradictory myths say Celeste is the colour of the Milan sky, the eye colour of a former queen of Italy for whom Edoardo Bianchi made a bicycle (the crowned eagle of the company logo is an adaptation of the former royal crest) and that it was a mixture of surplus military paint.[9,10] The shade has changed over the years, sometimes more blue, then more green.[2] Bianchi also took part in motorcycle races, where one of its first riders was Tazio Nuvolari, whom Ferdinand Porsche called "the greatest driver of the past, the present, and the future."[11,12]

The company began making trucks in the 1930s and supplied the Italian army during World War II . It was that that brought the end of production shortly after peace returned because the factory had been so heavily bombed.

Bianchi continued with motorcycles, particularly the 125cc Bianchina and the Aquilotto, an auxiliary motor for a conventional bicycles. Bianchi took on Lino Tonti as its research engineer in 1959. It produced 250, 350 and 500cc machines and took part in grands prix in 1960. The company also produced a model for the Italian army and a civilian scooter, the Orsetto 80. Piaggio bought out Bianchi Motorcycles in 1967.

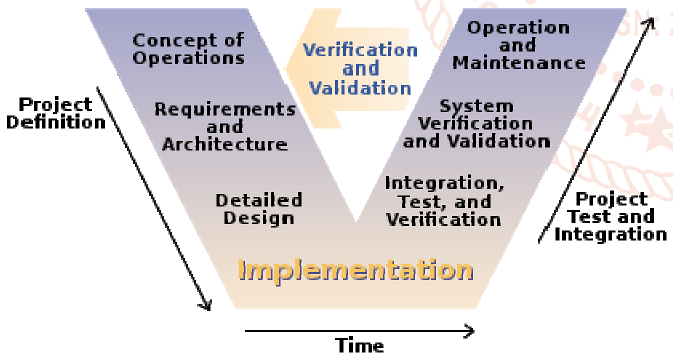
In 1955, Bianchi created a car brand, Autobianchi, in collaboration with Pirelli and Fiat. The three turned out only a handful of models, almost exclusively small cars, the biggest being the short-lived Autobianchi A111. Traditionally, Autobianchi motor vehicles cost more than equivalent Fiat models.[13]

Fiat used Autobianchi to test new production concepts such as glass fibre and front-wheel drive. Eventually, Fiat bought out Autobianchi and integrated it with Lancia. Autobianchi are no longer in production beginning from 1995 when, everywhere except Italy, its Y10 hatchback was rebranded a Lancia.

The V-model is a graphical representation of a systems development lifecycle. It is used to produce rigorous development lifecycle models and project management models. The V-model falls into three broad categories, the German V-Modell, a general testing model and the US government standard.[2]

The V-model summarizes the main steps to be taken in conjunction with the corresponding deliverables within computerized system validation framework, or project life cycle development. It describes the activities to be performed and the results that have to be produced during product development.[14]

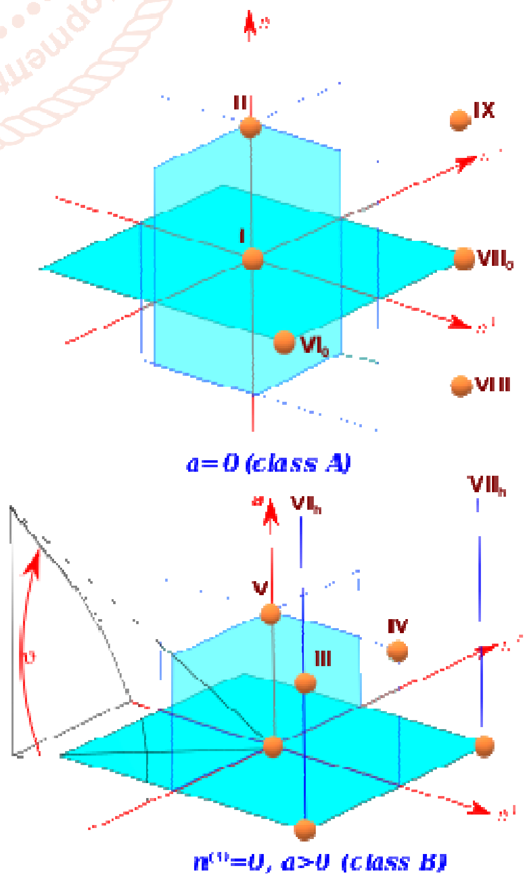
The left side of the "V" represents the decomposition of requirements, and creation of system specifications. The right side of the "V" represents integration of parts and their validation.[3][4][5][6][7] However, requirements need to be validated first against the higher level requirements or user needs. Furthermore, there is also something as validation of system models. This can partially be done at the left side also. To claim that validation only occurs at the right side may not be correct. The easiest way is to say that verification is always against the requirements (technical terms) and validation always against the real world or the user needs. The aerospace standard RTCA DO-178B states that requirements are validated—confirmed to be true—and the end product is verified to ensure it satisfies those requirements.



Validation can be expressed with the query "are you building the right thing?" and verification with "are you building it right?" The German V-Model "V-Modell", the official project management method of the German government. It is roughly equivalent to PRINCE2, but more directly relevant to software development.[8] The key attribute of using a "V" representation was to require proof that the products from the left-side of the V were acceptable by the appropriate test and integration organization implementing the right-side of the V.

The V-model provides guidance for the planning and realization of projects. The following objectives are intended to be achieved by a project execution:

- Minimization of project risks: The V-model improves project transparency and project control by specifying standardized approaches and describing the corresponding results and responsible roles. It permits an early recognition of planning deviations and risks and improves process management, thus reducing the project risk.
- Improvement and guarantee of quality: As a standardized process model, the V-Model ensures that the results to be provided are complete and have the desired quality. Defined interim results can be checked at an early stage. Uniform product contents will improve readability, understandability and verifiability.
- Reduction of total cost over the entire project and system life cycle: The effort for the development, production, operation and maintenance of a system can be calculated, estimated and controlled in a transparent manner by applying a standardized process model. The results obtained are uniform and easily retraced. This reduces the acquirer's dependency on the supplier and the effort for subsequent activities and projects.
- Improvement of communication between all stakeholders: The standardized and uniform description of all relevant elements and terms is the basis for the mutual understanding between all stakeholders. Thus, the frictional loss between user, acquirer, supplier and developer is reduced.

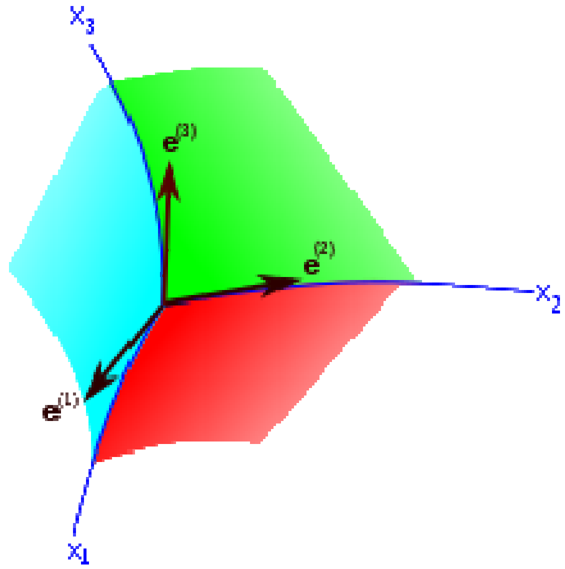


The parameter space as a 3-plane (class A) and an orthogonal half 3-plane (class B) in R^4 with coordinates ($n^{(1)}$, $n^{(2)}$, $n^{(3)}$, a), showing the canonical representatives of each Bianchi type.

DISCUSSION

The systems engineering process (SEP) provides a path for improving the cost-effectiveness of complex systems as experienced by the system owner over the entire life of the system, from conception to retirement.[1]

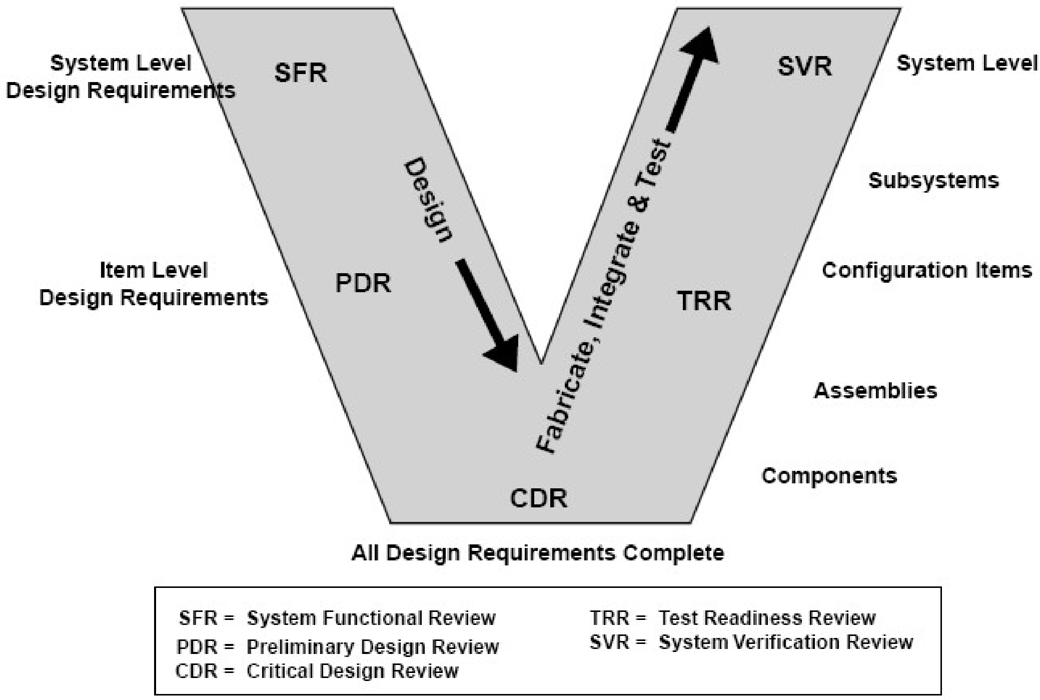
It involves early and comprehensive identification of goals, a concept of operations that describes user needs and the operating environment, thorough and testable system requirements, detailed design, implementation, rigorous acceptance testing of the implemented system to ensure it meets the stated requirements (system verification), measuring its effectiveness in addressing goals (system validation), on-going operation and maintenance, system upgrades over time, and eventual retirement.[1][3][4][7]



The triad $e^{(a)}$ ($e^{(1)}$, $e^{(2)}$, $e^{(3)}$) is an affine coordinate system (including as a special case Cartesian coordinate system) whose coordinates are functions of the curvilinear coordinates x_α (x_1, x_2, x_3).

The process emphasizes requirements-driven design and testing. All design elements and acceptance tests must be traceable to one or more system requirements and every requirement must be addressed by at least one design element and acceptance test. Such rigor ensures nothing is done unnecessarily and everything that is necessary is accomplished.[1][3]

The V-model is used to regulate the software development process within the German federal administration. Nowadays it is still the standard for German federal administration and defense projects, as well as software developers within the region.[15]

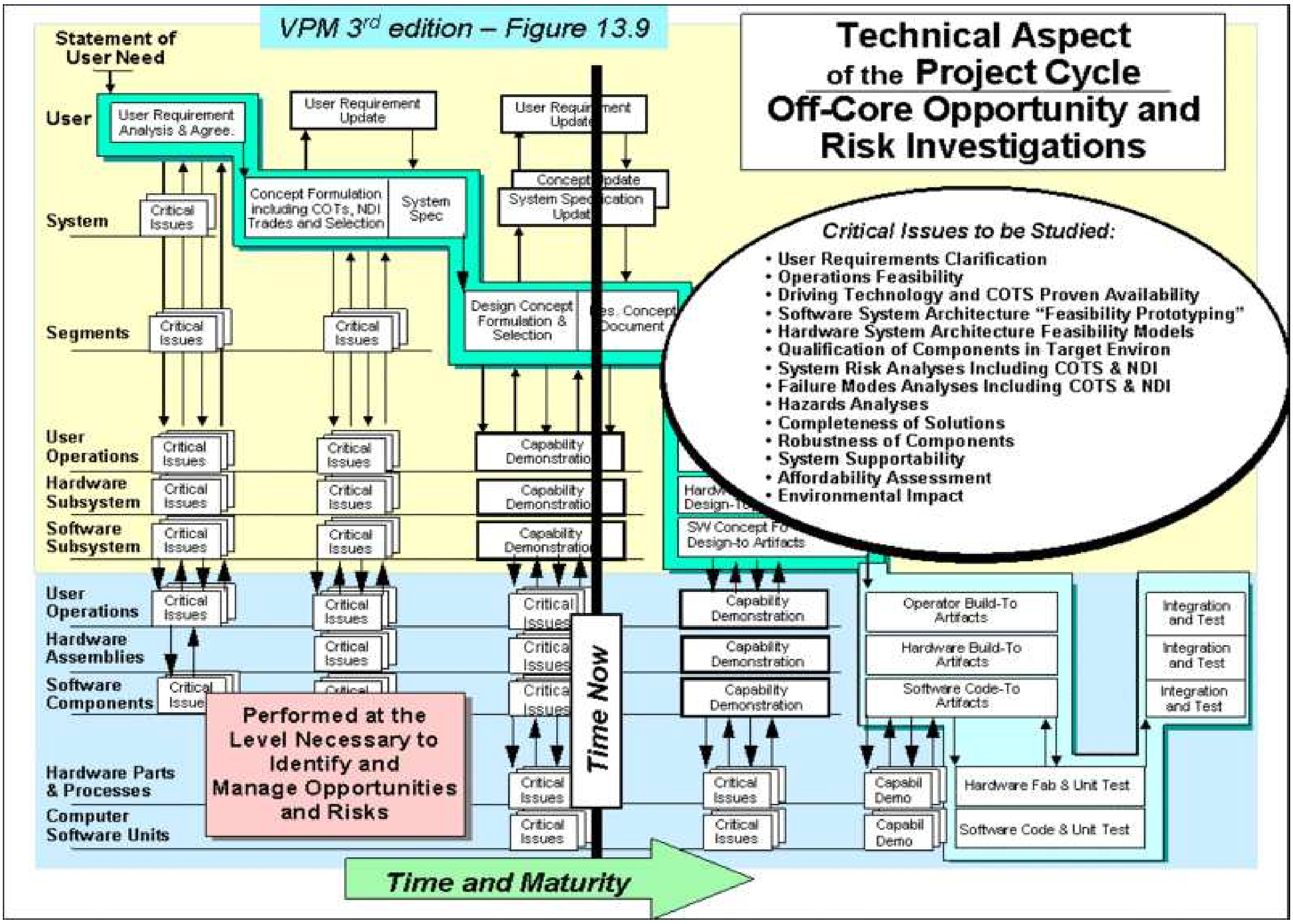


The concept of the V-model was developed simultaneously, but independently, in Germany and in the United States in the late 1980s:

The German V-model was originally developed by IABG in Ottobrunn, near Munich, in cooperation with the Federal Office for Defense Technology and Procurement in Koblenz, for the Federal Ministry of Defense. It was taken over by the Federal Ministry of the Interior for the civilian public authorities domain in summer 1992.[19]

The US V-model, as documented in the 1991 proceedings for the National Council on Systems Engineering (NCOSE; now INCOSE as of 1995),[7] was developed for satellite systems involving hardware, software, and human interaction.[15]

The V-model first appeared at Hughes Aircraft circa 1982 as part of the pre-proposal effort for the FAA Advanced Automation System (AAS) program. It eventually formed the test strategy for the Hughes AAS Design Competition Phase (DCP) proposal. It was created to show the test and integration approach which was driven by new challenges to surface latent defects in the software. The need for this new level of latent defect detection was driven by the goal to start automating the thinking and planning processes of the air traffic controller as envisioned by the automated enroute air traffic control (AERA) program.

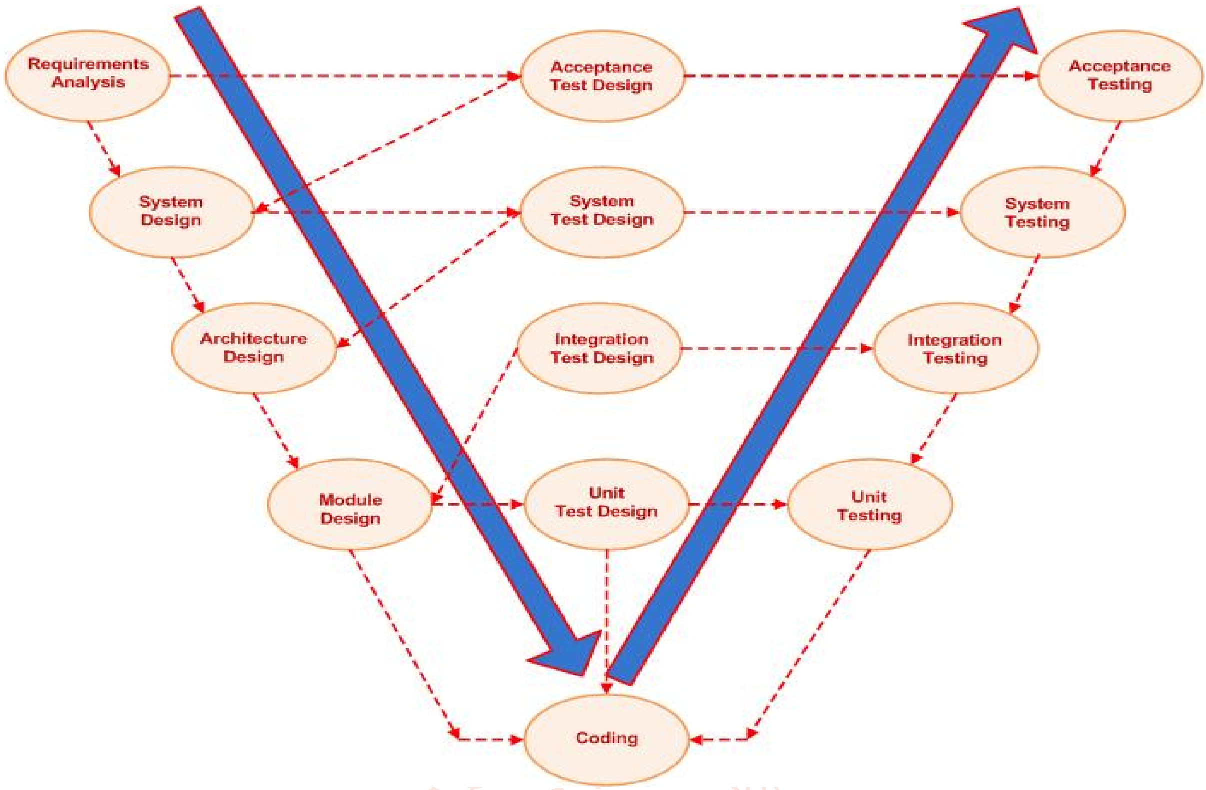


Off-Core alternatives (illustrating upward and downward iterations and Time and Maturity dimension). Source - K. Forsberg and H. Mooz 2004

The reason the V is so powerful comes from the Hughes culture of coupling all text and analysis to multi dimensional images. It was the foundation of Sequential Thematic Organization of Publications (STOP) [2] created by Hughes in 1963 and used until Hughes was divested by the Howard Hughes Medical Institute in 1985.[2]The US Department of Defense puts the systems engineering process interactions into a V-model relationship.[2] It has now found widespread application in commercial as well as defense programs. Its primary use is in project management[3][4] and throughout the project lifecycle. One fundamental characteristic of the US V-model is that time and maturity move from left to right and one cannot move back in time. All iteration is along a vertical line to higher or lower levels in the system hierarchy, as shown in the figure.[3][4][7] This has proven to be an important aspect of the model. The expansion of the model to a dual-Vee concept is treated in reference.[3]As the V-model is publicly available many companies also use it. In project management it is a method comparable to PRINCE2 and describes methods for project management as well as methods for system development. The V-Model, while rigid in process, can be very flexible in application, especially as it pertains to the scope outside of the realm of the System Development Lifecycle normal parameters.[14]

RESULTS

Bianchi universes are the class of cosmological models that are homogeneous but not necessarily isotropic on spatial slices, named after Luigi Bianchi who classified the relevant 3-dimensional spaces.



They contain, as a subclass, the standard isotropic models known as Friedmann-Lemaître-Robertson-Walker (FLRW) universes. Calculations of nucleosynthesis and microwave background anisotropies in Bianchi models have been compared against data from the real Universe, typically giving null results which can be translated into upper limits on anisotropy. Tentative detections of non-zero anisotropic shear by Jaffe et al (2005) are currently believed to be inconsistent with other known cosmological parameters (Planck Collaboration et al 2015) and with polarisation of the microwave background However the models remain widely-studied for their pedagogical value: homogeneity in space implies that the Einstein equations reduce from partial to ordinary differential equations in time, making them tractable exact solutions of Einstein's field equation.

In mathematics, the Bianchi classification provides a list of all real 3-dimensional Lie algebras (up to isomorphism). The classification contains 11 classes, 9 of which contain a single Lie algebra and two of which contain a continuum-sized family of Lie algebras. (Sometimes two of the groups are included in the infinite families, giving 9 instead of 11 classes.) The classification is important in geometry and physics, because the associated Lie groups serve as symmetry groups of 3-dimensional Riemannian manifolds. It is named for Luigi Bianchi, who worked it out in 1898.

The term "Bianchi classification" is also used for similar classifications in other dimensions and for classifications of complex Lie algebras.[12]

In cosmology, this classification is used for a homogeneous spacetime of dimension 3+1. The 3-dimensional Lie group is as the symmetry group of the 3-dimensional spacelike slice, and the Lorentz metric satisfying the Einstein equation is generated by varying the metric components as a function of t. The Friedmann–Lemaître–Robertson–Walker metrics are isotropic, which are particular cases of types I, V, and IX. The Bianchi type I models include the Kasner metric as a special case. The Bianchi IX cosmologies include the Taub metric. However, the dynamics near the singularity is approximately governed by a series of successive Kasner (Bianchi I) periods. The complicated dynamics, which essentially amounts to billiard motion in a portion of hyperbolic space, exhibits chaotic behaviour, and is named Mixmaster; its analysis is referred to as the BKL analysis after Belinskii, Khalatnikov and Lifshitz. More recent work has established a relation of (super-) gravity theories near a spacelike singularity (BKL-limit) with Lorentzian Kac–Moody algebras, Weyl groups and hyperbolic Coxeter groups. Other more recent work is concerned with the discrete nature of the Kasner map and a continuous generalisation. In a space that is both homogeneous and isotropic the metric is determined completely, leaving free only the sign of the curvature. Assuming only space homogeneity with no additional symmetry such as isotropy leaves considerably more freedom in choosing the metric. The following pertains to the space part of the metric at a given instant of time t assuming a synchronous frame so that t is the same synchronised time for the whole space.

CONCLUSIONS

In 2007, David Wiltshire, a professor of theoretical physics at the University of Canterbury in New Zealand, argued in the New Journal of Physics that quasilocal variations in gravitational energy had in 1998 given the false conclusion that the expansion of the universe is accelerating.[8] Moreover, due to the equivalence principle, which holds that gravitational and inertial energy are equivalent and thus prevents aspects of gravitational energy from being differentiated at a local level, scientists thus misidentified these aspects as dark energy.[8] This misidentification was the result of presuming an essentially homogeneous universe, as the standard cosmological model does, and not accounting for temporal differences between matter-dense areas and voids. Wiltshire and others argued that if the universe is not only assumed not to be homogeneous but also not flat, models could be devised in which the apparent acceleration of the universe's expansion could be explained otherwise.[3]

One more important step being left out of the standard model, Wiltshire claimed, was the fact that as proven by observation, gravity slows time. Thus, a clock will move faster in empty space, which possesses low gravitation, than inside a galaxy, which has much more gravity, and he argued that as large as a 38% difference between the time on clocks in the Milky Way and those in a galaxy floating in a void exists. Thus, unless we can correct for that—timescapes each with different times—our observations of the expansion of space will be, and are, incorrect. Wiltshire claims that the 1998 supernovae observations that led to the conclusion of an expanding universe and dark energy can instead be explained by Buchert's equations if certain strange aspects of general relativity are taken into account.[3][14]

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