Discrete 3D surfaces of revolution

Final presentation

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Thomas Benoist
Adrien Bisutti
Lydie Richaume

University of Poitiers

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Outline

Outline

Collaborators and clients

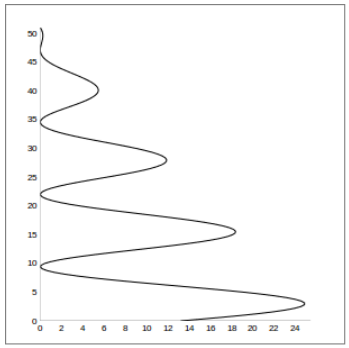
- Clients :
  - Éric ANDRES (Professor and former director of XLIM-SIC department)
  - Gaëlle LARGETEAU-SKAPIN (University lecturer, Discrete geometry)
- Exemple of final user :
  - Aurélie MOURIER (Artist)
- Pedagogic Supervisor :
  - Philippe MESEURE (Professor, Computer Graphics)

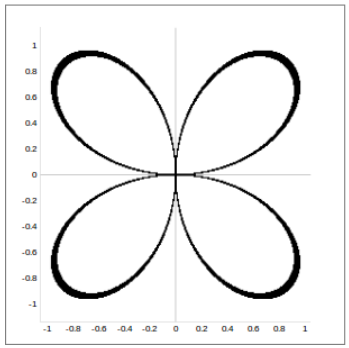
Roles

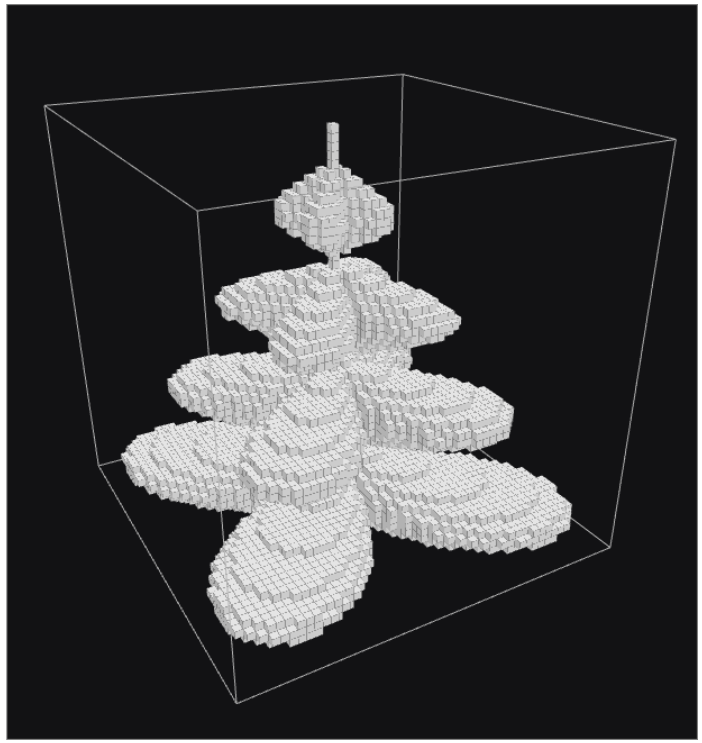
- Team composition :
  - Thomas BENOIST - Project manager
  - Zied BEN OTHMANE - Quality manager
  - Adrien BISUTTI - Risks manager
  - Lydie RICHAUME - Tasks manager

Context

- Éric Andres and Gaëlle Largeteau-Skapin developed a new algorithm to model discrete surfaces of revolution.
- Display the result with Mathematica







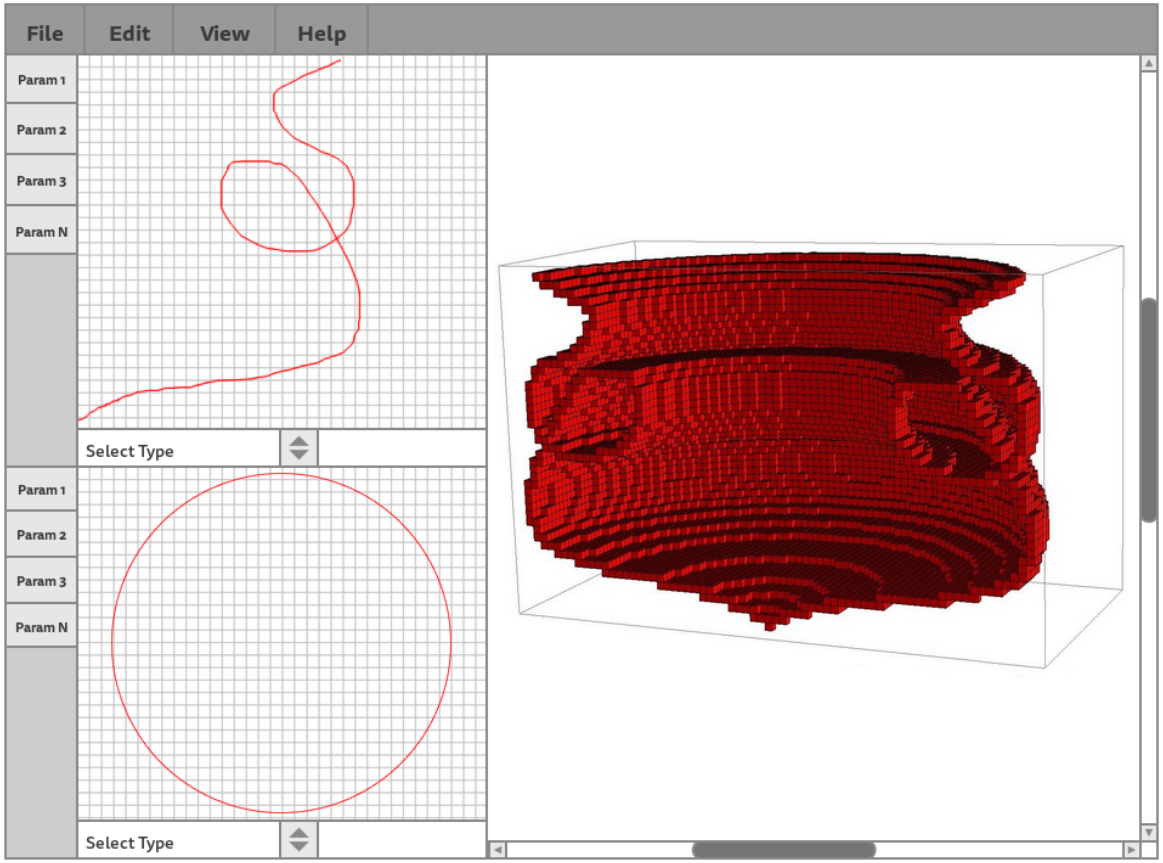
- Need of a tool usable by everyone and everywhere

Objectives

- Surfaces visualization tool
  - 3D, slices visualization
  - Choose the generatrix and directrix
  - Export the results
- Algorithm to generate surfaces of revolution
  - Provided by the customers
  - Possible evolution of the algorithm

Outline

Prototype


File
Edit
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Param 1
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Param 3
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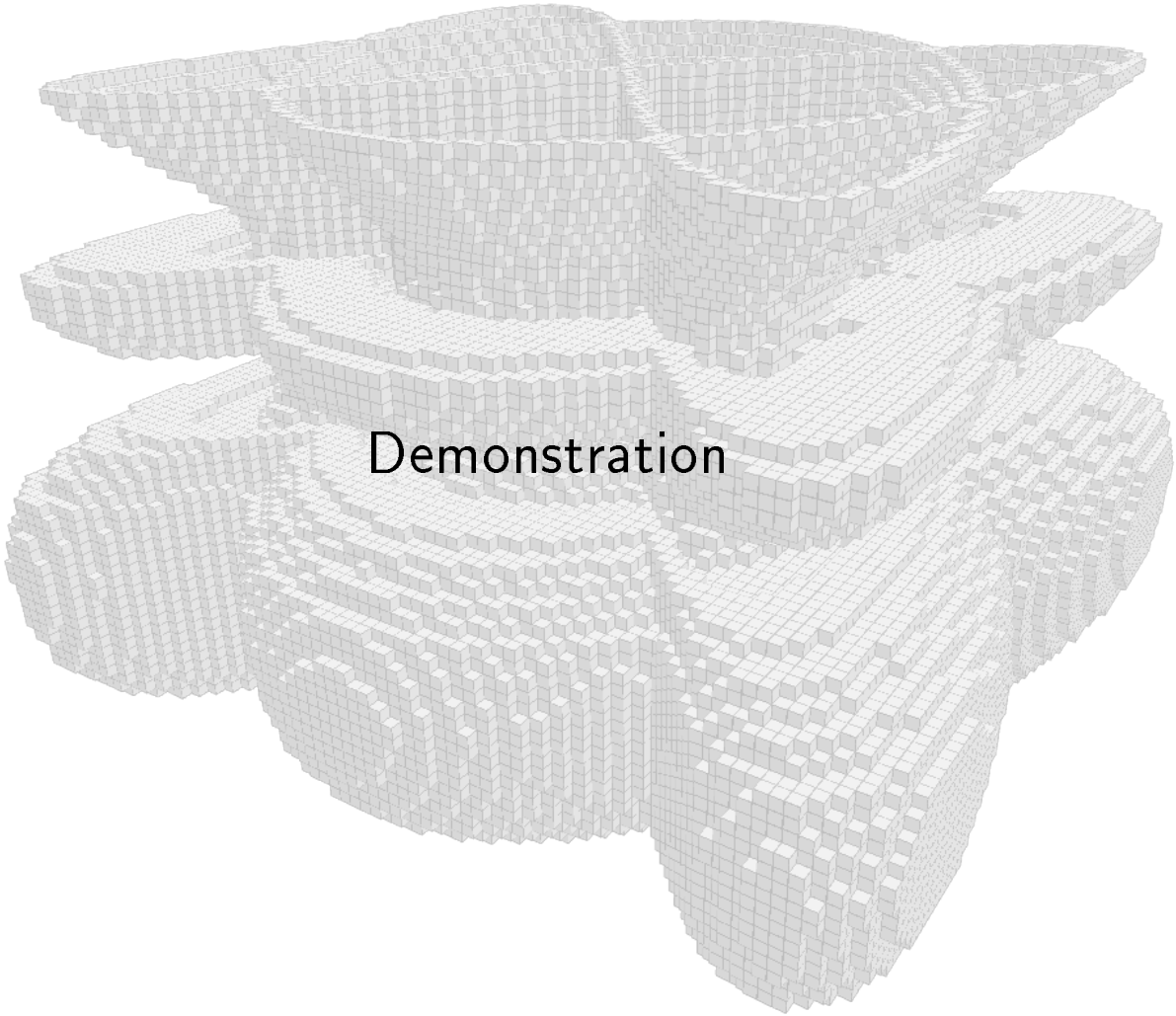
Select Type

Demonstration



Difficulties

- Generation
  - Just what do you want
  - All in one pass
- Rendering
  - Calcul à la volé lors de la demende d'affichage
  - Précalcul lors de la génération
  - Ingoré $\rightarrow$ laissé à la carte graphique
- Implicit curve display
  - Dicretisation of the curve
  - Use a library

Architecture

- Controllers
- Displayers
- Interface managers
- Shaders
- Threads

TODO mettre un diagram ?

Outline

Task list

1 - Documentation, test et aide utilisateur			V
2 - Conception			V
3 - Noyau fonctionnel	V	4 - Interface minimale	V
6 - Ajout de fonctionnalités	V	5 - Amélioration IHM Choix des courbes	V
8 - Dessin à main levée méridienne	V	7 - Amélioration IHM Paramètres	V
9 - Gestion des données	V	10 - Amélioration IHM Rentrer des formules	V
11 - Ajout courbes utilisateur			X
12 - Rédaction rapport technique			V

Gantt diagram

Diagramme prévisionnel

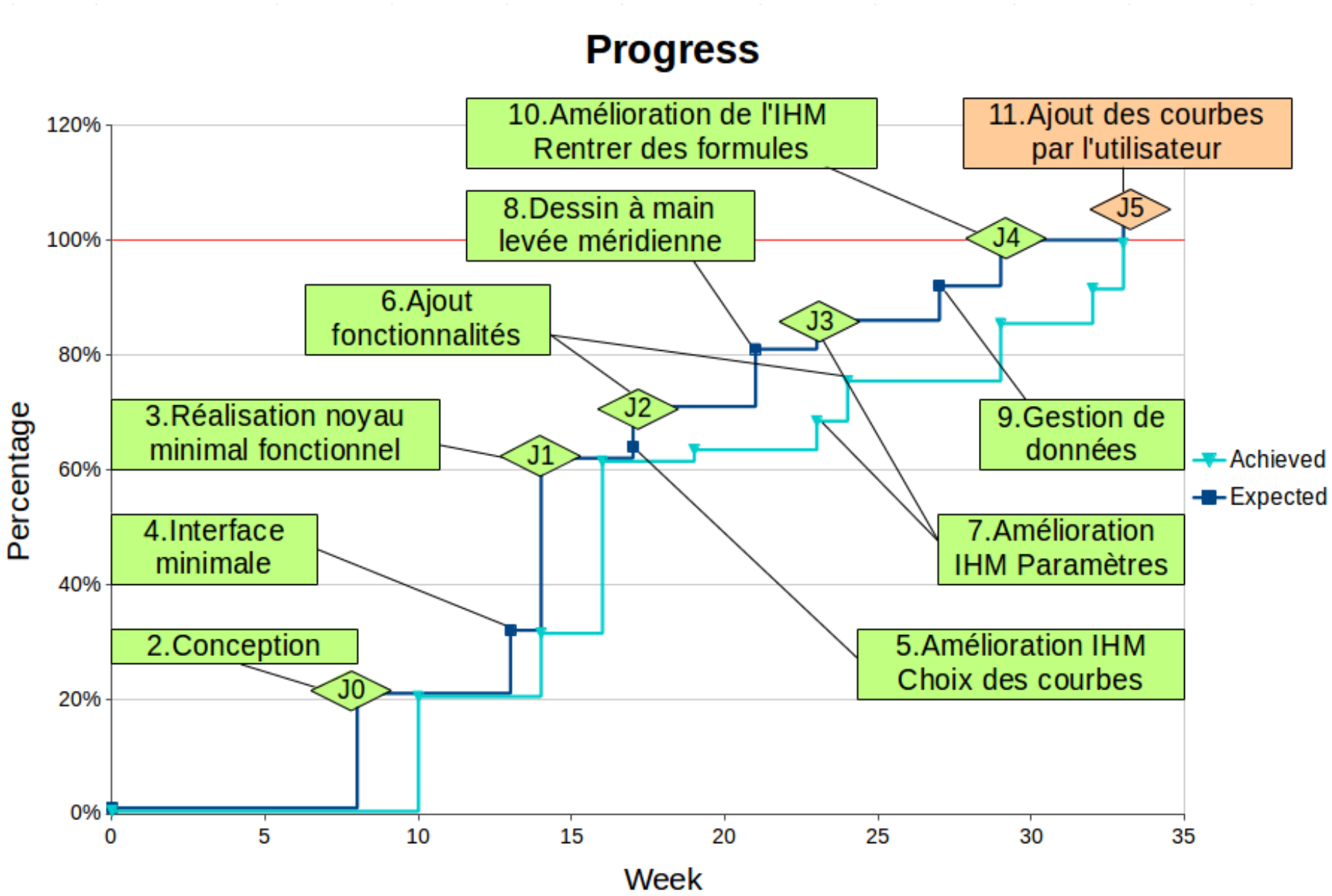
Diagramme réalisé

Zoom

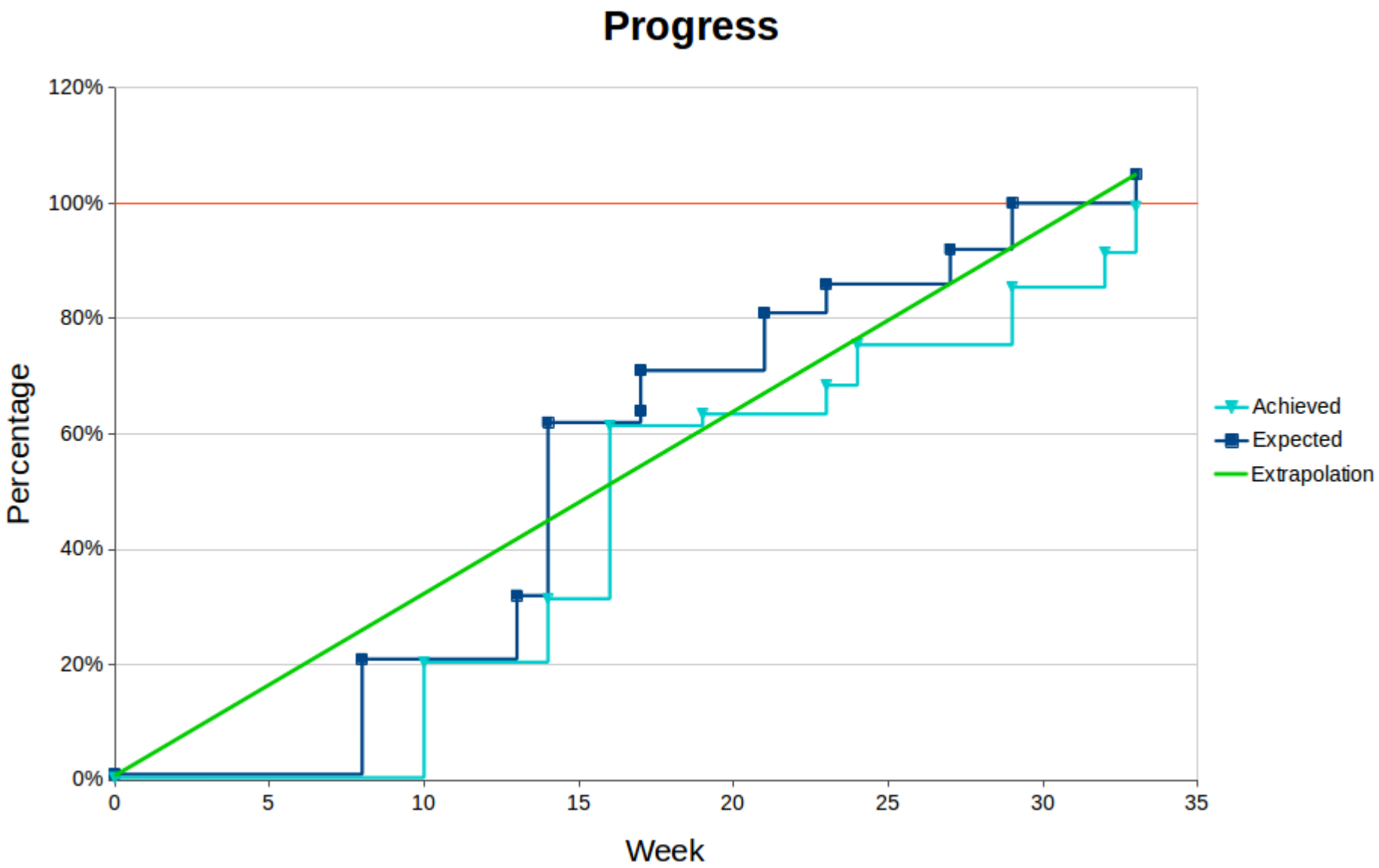
Diagramme prévisionnel

Diagramme réalisé

Progress


Progress
10.Amélioration de l'IHM
Rentrer des formules
11.Ajout des courbes
par l'utilisateur
8.Dessin à main
levée méridienne
6.Ajout
fonctionnalités
3.Réalisation noyau
minimal fonctionnel
9.Gestion de
données
4.Interface
minimale
7.Amélioration
IHM Paramètres
2.Conception
5.Amélioration IHM
Choix des courbes
J0
J1
J2
J3
J4
J5
120%
100%
80%
60%
40%
20%
0%
Percentage
0
5
10
15
20
25
30
35
Week
Achieved
Expected

Progress


Progress
120%
100%
80%
60%
40%
20%
0%
Percentage
0
5
10
15
20
25
30
35
Week
Achieved
Expected
Extrapolation

Deliverables

N°	Deliverable	Planned date	Actual date
1	Interface and algorithm result	Dec. 23rd	Jan. 18th
2	Minimal application	Jan. 21st	Jan. 25th
2bis	Multicoupe et paramètres	—	Jan. 29th
3	Free hand drawing and curves with editable parameters	Jan. 29th	Feb. 24th
4	Equations and export	Feb. 19th	Feb. 24th
5	Final application	Mar. 2nd	Mar. 2nd
5bis	Final documentation	Mar. 11th	Mar. 14th

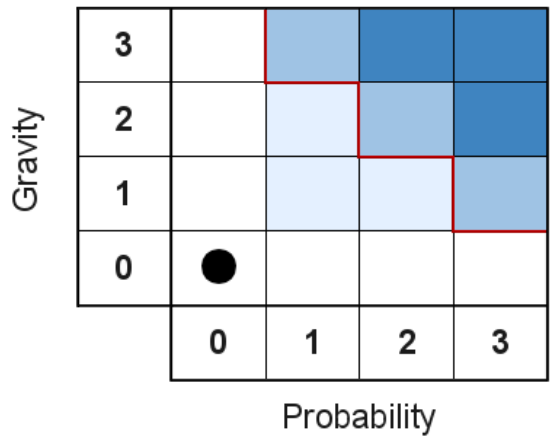
List of risks

Risk	Gravity	Probability	Criticity	
Server linked problems	1	0	0	*
Panne ou dysfonctionnement des appareils	1	1	1	+!
New client	1	2	1	*!
La validation met en évidence un grave problème technique	2	1	1	*
Rendu 3D demandant trop de ressources	2	1	1	*!?
Evolution of the generation algorithm	1	3	2	*

Risk evolution

- Server linked problems

Gravity	0	1	2	3
Delay	●			
Costs	●			
Receipts	●			
Performance	●			
Other				
Global	●			

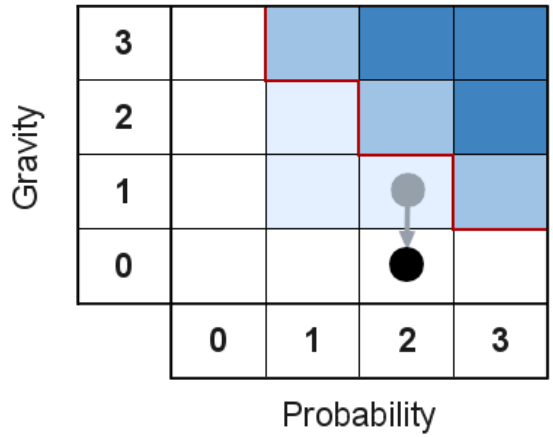


Level	Gravity	Probability	Criticity
0	None	$< 1\%$	No critical
1	Low (marges)	de 1% à 5%	
2	Important	de 5% à 20 %	Critical
3	Dangerous	$> 20\%$	

Risk evolution

- New clients

Gravity	0	1	2	3
Delay	●	●		
Costs	●			
Receipts	●			
Performance	●	●		
Other				
Global	●	●		

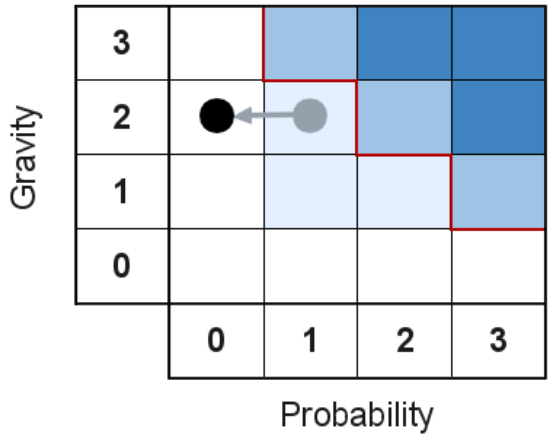


Level	Gravity	Probability	Criticity
0	None	$< 1\%$	No critical
1	Low (marges)	de 1% à 5%	
2	Important	de 5% à 20 %	Critical
3	Dangerous	$> 20\%$	

Risk evolution

- Slow rendering

Gravity	0	1	2	3
Delay			●	
Costs	●			
Receipts	●			
Performance			●	
Other				
Global			●	



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0	None	$< 1\%$	No critical
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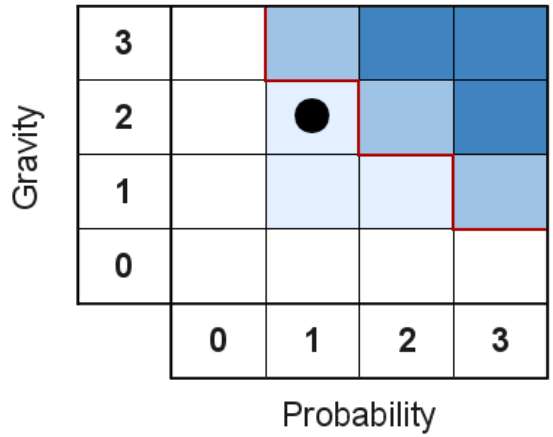
Risk evolution

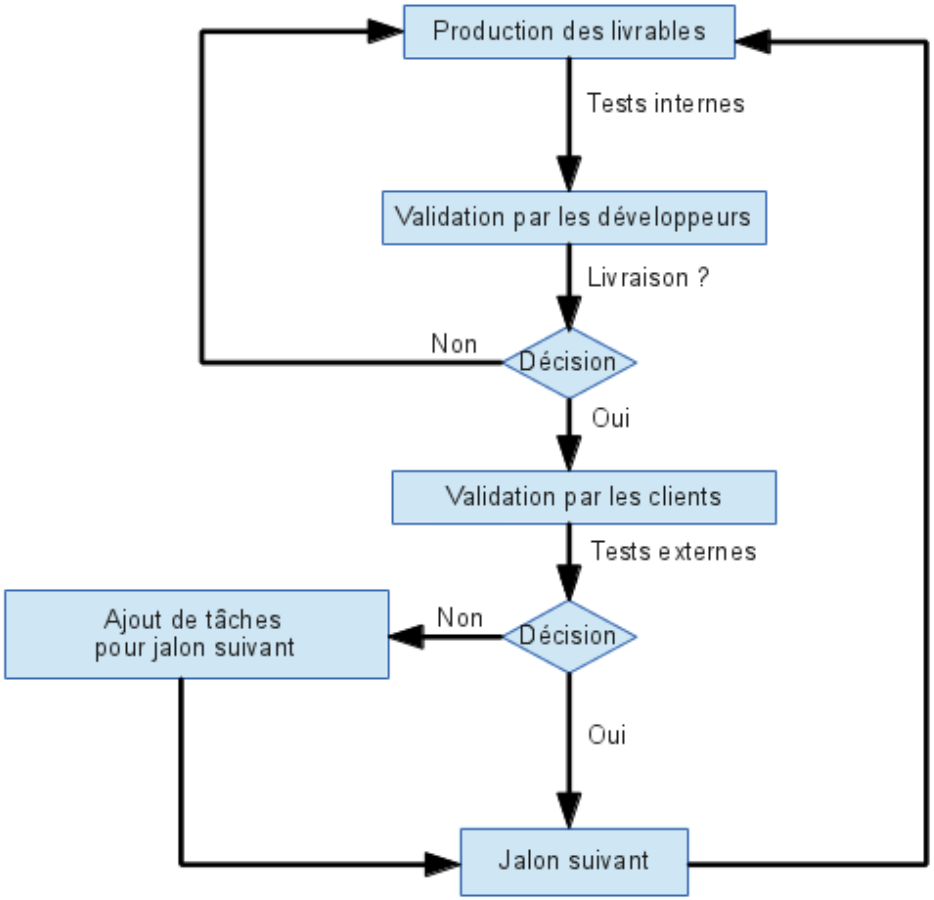
- Evolution of the generation algorithm

Gravity	0	1	2	3
Delay	●			
Costs	●			
Receipts	●			
Performance			●	
Other				
Global			●	



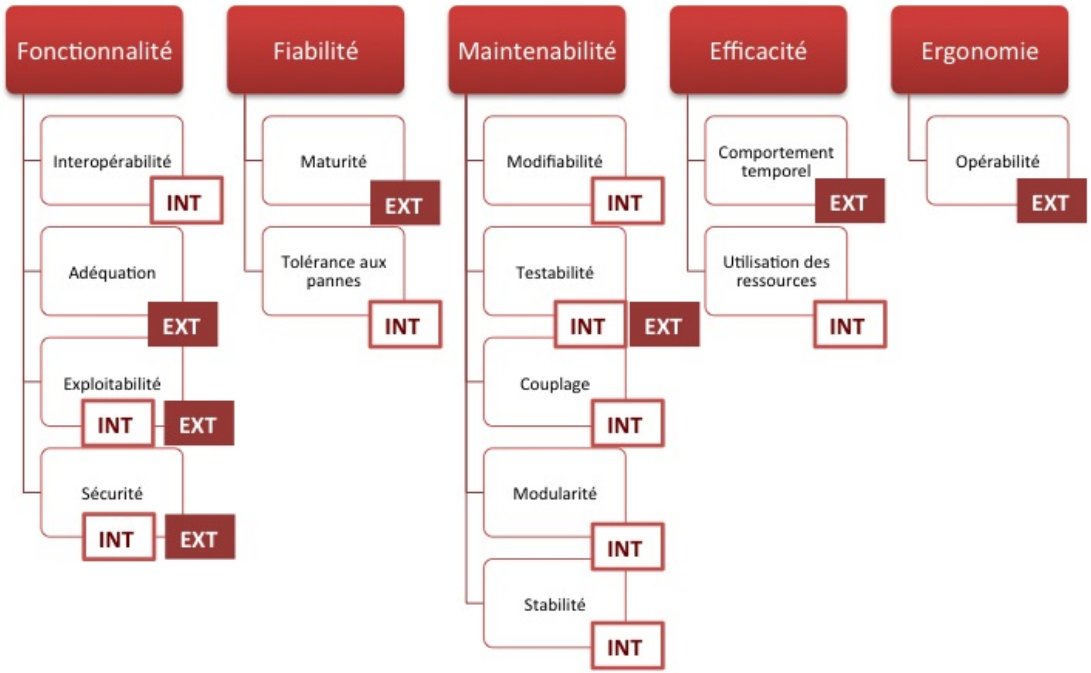
Level	Gravity	Probability	Criticity
0	None	$< 1\%$	No critical
1	Low (marges)	de 1% à 5%	
2	Important	de 5% à 20 %	Critical
3	Dangerous	$> 20\%$	

Quality insurance plan



Milestones validation with the clients

ISO 9126



Why ISO-9126 ?

- International standard for the evaluation of software quality
- Given a quality note according to different criteria
- Validation of the application by the clients and the quality manager
- Externals and internals tests

Software quality measurment

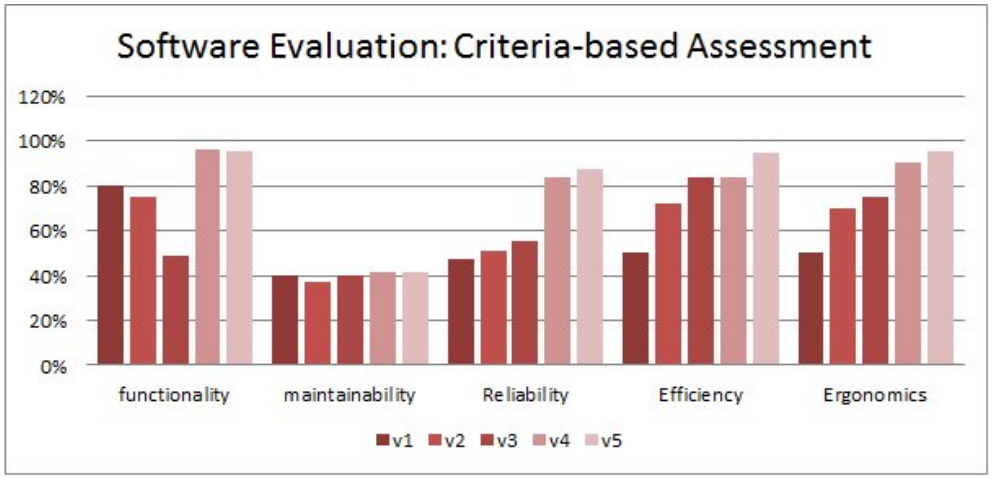
1	Question	Version 1	Version 2	Version 3	Version 4	Version 5
1	overall vision	1	1	0.5	1	1
2	The ease to find the information	0.5	0.5	0.5	0.5	1
3	Response speed	0.5	0.5	0.5	1	1
4	utility of the information	0	0.5	0.5	1	1
5	The choice of title and heading and their meanings	0.5	1	1	1	1
6	The completeness of the information found against the need	1	0.5	1	1	1
7	Rapidité d'exécution	0	0.5	1	1	1
8	Errors rate	0.5	0.5	0.5	1	1
9	Handling the use	1	1	1	0.5	0.5
10	The reliability of the application	0	1	1	1	1
	Total	50%	70%	75%	90%	95%

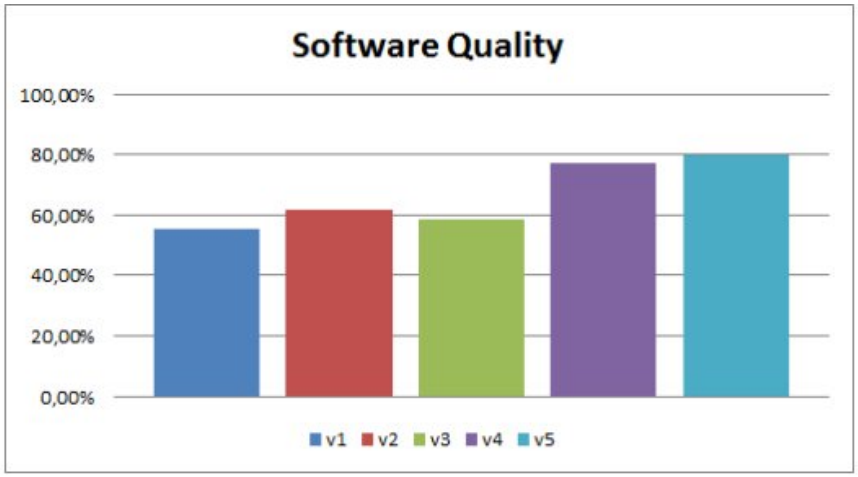
1	functionality	Level 1		Level 2		Level 3		Level 4		Level 5	
		INT	EXT	INT	EXT	INT	Ext	INT	Ext	INT	Ext
1	interoperability										
Goal	ability to interact with one or more systems										
Question	Is the application uses norms and technical standards?										
Evaluation		90%		75%		85%		100%		95.83%	
1	Adequacy										
Goal	Checking the adequacy of spots against the needs										
Question	Does each function is adequate to the customer need?										
Evaluation			100%		80%		25%		85%		90%
0.5	operability										
Goal	the ability to properly use the software system										
Question	At what level the software is usable?										
Evaluation		25 %	25 %		32.14%	35.71%	35.71%		100%		100%
	Note I/E	76.66 %	83.33%	75%	74.76%	60.35%	30.35%	100%	92.5%	95.83%	95%
	Fonctionnalité	79.99 %		74.88 %		45.35 %		96.25%		95.41%	

Standard divisions

1. Quality model
2. External metrics
3. Internal metrics
4. Quality in use metrics

Software quality evaluation



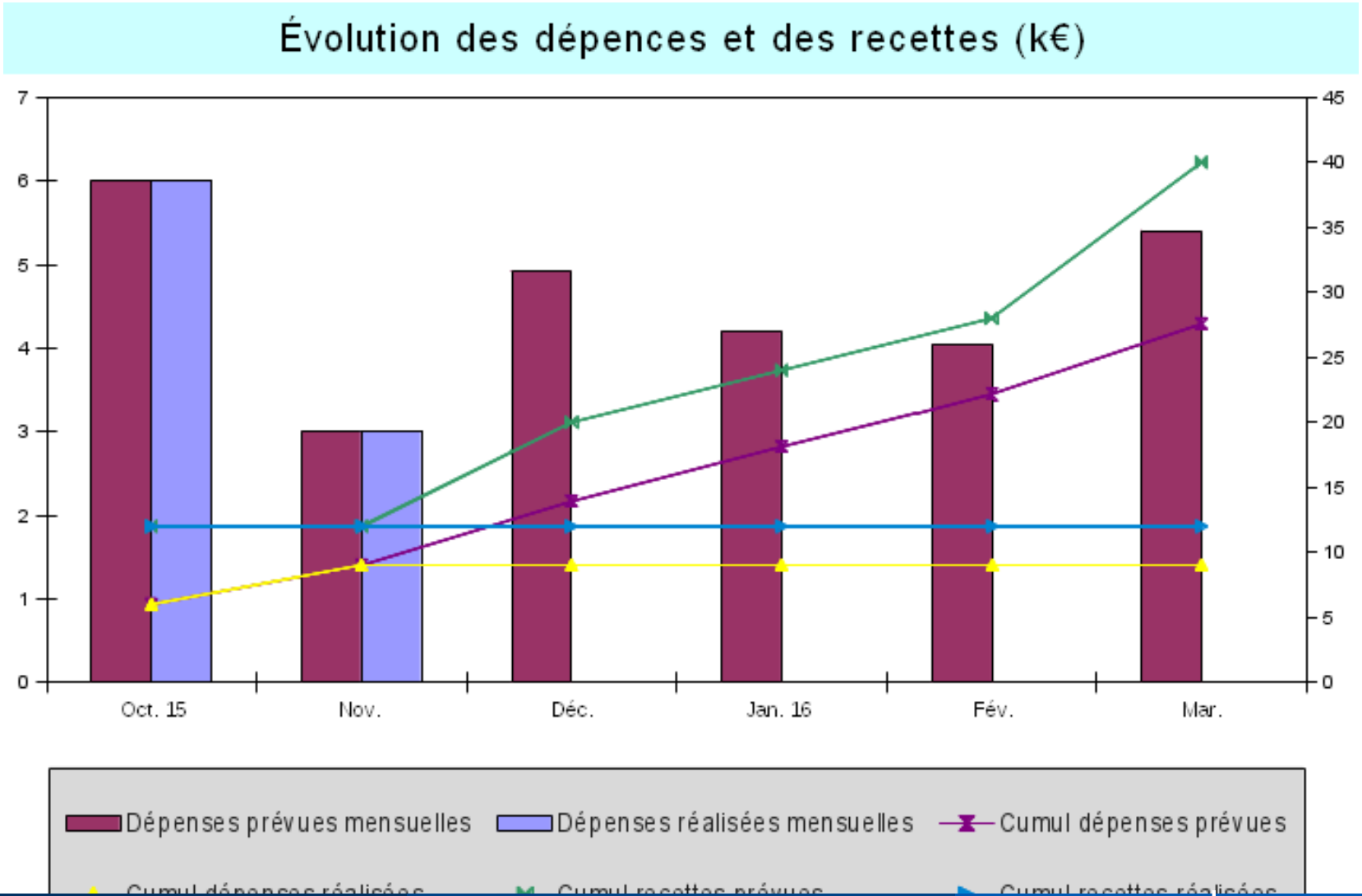


Q.I.P Reviews

1. The use of such techniques for explicitly and analyzing such quality during the requirements phases
2. Well-differentiated characteristics of software quality has been developed
3. A large number of software quality-evaluation metrics have been defined
4. Quality can lead to significant savings in software life-cycle costs

Costs

Figure: TODO regénéré cette image



Outline

Conclusion

- Technical Javascript improvement (classes, worker, blob, webgl, etc.)
- Final delivrable in two step
- Perspectives
  - Réutilisation dans quelques semaines
  - Ajout de nouveau(x) algo

Conclusion

- Javascript improvement (classes, worker, blob, etc.)
- WebGl improvement
- Résolution de problème mathématique (matrice de changement de repère, tracer de courbe implicite)

Discrete 3D surfaces of revolution

Final presentation

Thanks for your attention.

Are there any questions ?