

## A STUDY ON OPPORTUNITIES FOR INDUSTRIAL MATHEMATICS STUDENTS IN IT-SECTOR

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Prachi Chavan\*  
Ms. Mariya Shaikh\*\*

### ABSTRACT

*There is no question that mathematics has played a leading role in many industrial sectors. Mathematics has already been verified to be beneficial, and it has begun to demonstrate how it can enhance competitiveness. The interface between mathematics and industry is much more than a medium for technology transfer. The vision that underlies this report is knowledge is shared profitably by the mathematical and industrial communities. The direct participation of mathematicians in solving the problems of industry is the new trend, so called "Industrial mathematics". Industrial mathematics has developed as a new profession. In this report, we will discuss the significance and future of industrial mathematics in the IT industry.*

**Keywords:** *Industrial Mathematics, Opportunities and IT Sector.*

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### Introduction

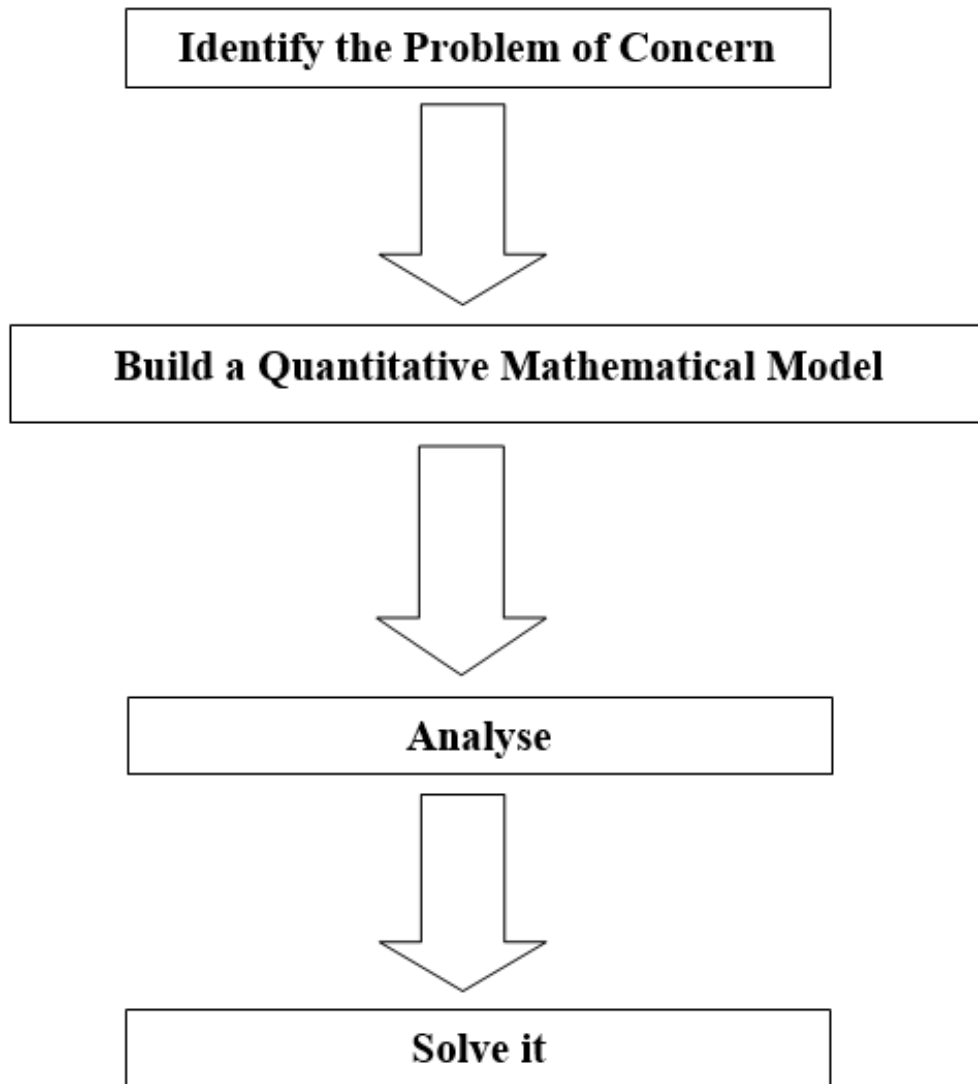
A respected discipline in the mathematical sciences community is industrial mathematics and interdisciplinary by nature it teaches learners of mathematics how to connect mathematical insights to problems that come up in non-mathematical fields including finance, IT, and technology in along with mathematics. An industrial mathematician has a background in the field of computing, calculus, and fundamental sciences as well as excellent abilities to analyse and solve problems. Furthermore, industrial mathematics focuses on written and verbal communication competencies in addition to teamwork—skills that are extremely important among entrepreneurs but are left out from the vast majority of traditional mathematics curricula. These abilities are crucial to industrial mathematics since they allow graduates to collaborate productively with peers who have limited expertise in mathematics. Mathematician 1 uses the exclusive knowledge of mathematics in their work and focuses on a way to understand the relationship between abstract objects. Modern mathematics is broadly divided into Pure Mathematics and Applied Mathematics. The difference between the two is based on their application. Pure Mathematics is a branch of mathematics that is studied, and principles are developed for the sake of mathematics rather than their immediate use.

### Mathematics in the Industrial Context

The essential programme of the applied mathematician when collaborating with industry follows essentially the following paradigm:

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\* Assistant Professor, Ashoka College of Education, Nashik, Maharashtra, India.  
\*\* Ashoka College of Education, Nashik, Maharashtra, India.



Then apply the results, and potentially create appropriate mathematical software that can be commercialised. The main emphasis is on identifying the constraints, the purpose, and the important and pertinent elements determining the problem in question. This can be achieved through examining pertinent observations and data combined with a comprehension of the fundamental processes at play. In every facet of the industry, model-based management and optimisation is a vital part of technology which usually minimizes the cost and durability of innovative goods, techniques, and services. The aforementioned process is often not visible in published research, and requires an active collaboration with the source of the application. Therefore mathematical modelers must have particular skills in communicating with non-mathematical collaborators and the ability to translate in mathematical terms the real world problems, to study them by the use of mathematical techniques and finally to transfer the mathematical results for non-specialists who are typically not interested in the methods of solution.

As Einstein said, "Things are to be made as simple as possible... but not simpler".

#### **General Opportunities**

- There is a general increasing awareness about the necessity of using mathematics to improve the competitiveness of the world economy

- The time is ideal to establish the required synergy because of the growing awareness of the needs of mathematical modeling
- The expertise in mathematics is extremely high in India, both in variety and quality. More and more mathematicians are ready to participate in industrial projects.
- Existing experiences and knowledge can be shared in order to increase the level of industrial collaboration in all countries. Indeed, the existing and reproducible examples of collaboration with industry can and must be spread.
- It is timely to start developing common networks and databases of industrial problems, mathematical experts and examples of collaboration.

#### **Methods of Communication between the Industry and Mathematics**

Challenges within industry that greatly benefit from mathematics can be categorized into several dimension:

- Particular issues when existing techniques or commercial codes fall short, where a new feature needs to be added, or where the models that are currently on the market don't fit the bill.
- Petite issues requiring the application of new technology, algorithmic methodologies, necessitating the launch of an innovative software for mathematics program.
- This is frequently accomplished through corporations that grow out from research labs or institutions of learning.
- High-tech jobs with high pay are created by these mathematical subsidiaries that either survive in the market or are acquired by large multinational companies.
- Projects of this nature usually take between three and six years to complete.

#### **Area of Math and Applications in Industry**

To solve industrial problems more effectively, industrial mathematics is beneficial.

In order to help companies manage risks, it has also been used to verify ideas before to manufacture, evaluate facilities ahead of construction, and provide an explanation for any process errors that may have occurred.

As mentioned by Deepanshi Vij in his paper on [https://www.academia.edu/64053185/\\_introduction\\_to\\_Industrial\\_Mathematics](https://www.academia.edu/64053185/_introduction_to_Industrial_Mathematics), the following table gives a view of the association between the areas of mathematics and applications:

#### **Mathematical Areas**

<b>Mathematical Areas</b>	<b>Application Areas</b>
Algebra and number theory	Cryptography
Computational fluid dynamics	Aircraft and automobile design
Differential equations	Aerodynamics, porous media, finance
Discrete mathematics	Communication and information security
Formal system and logic	Computer security, verification
Geometry	Computer-aided engineering and design
Nonlinear control	Operation of mechanical and electrical system
Numerical analysis	Essentially all applications
Optimization	Asset allocation, shape and system design
Stochastic processes	Signal analysis
Parallel algorithms	Weather modeling and prediction, crash simulation
Statistics	Design of experiments, analysis of large data sets

The field of industrial mathematics is interdisciplinary. Alternatively, its scope extends beyond mathematics to encompass several disciplines including enterprise, technology, sciences, and so forth.

Considering that mathematics represents the foundation of numerous other disciplines, there are far more professionals who use mathematical approaches than the technically empowered mathematicians.

Basically, applied mathematical professionals' partner up with other professionals to find joint resolutions to issues.

### Recommendations and Suggestions

- Recommendation 1: Policy makers and funding organisations should join their efforts to fund mathematics activities.
- Recommendation 2: Universities and companies must communicate and promote best practices via networks and digital platforms in order to overcome regional and scientific variance.
- Recommendation 3: Mathematical Associations and universities ought to develop standard curricula and educational initiatives in mathematics while considering regional expertise.

### Conclusion

The modern industrial and service industries have undergone significant transformation due to the swift developments in technological and scientific advances.

The implementation and use of complex techniques to satisfy the increasing demand rely heavily on industrial mathematics.

Additionally, because ideas travel both ways strongly, industrial mathematicians team up with professionals from other professions to generate novel products.

However, the importance of establishing and preserving professional ties between academia and industry is underemphasized.

Therefore, non-academic mathematicians ought to be motivated to boost research, instruction, and practical application in the fields of mathematics, sciences, commerce, and technology in order to broaden the scope of real-world issues and strengthen their beneficial effects on society.

### References

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