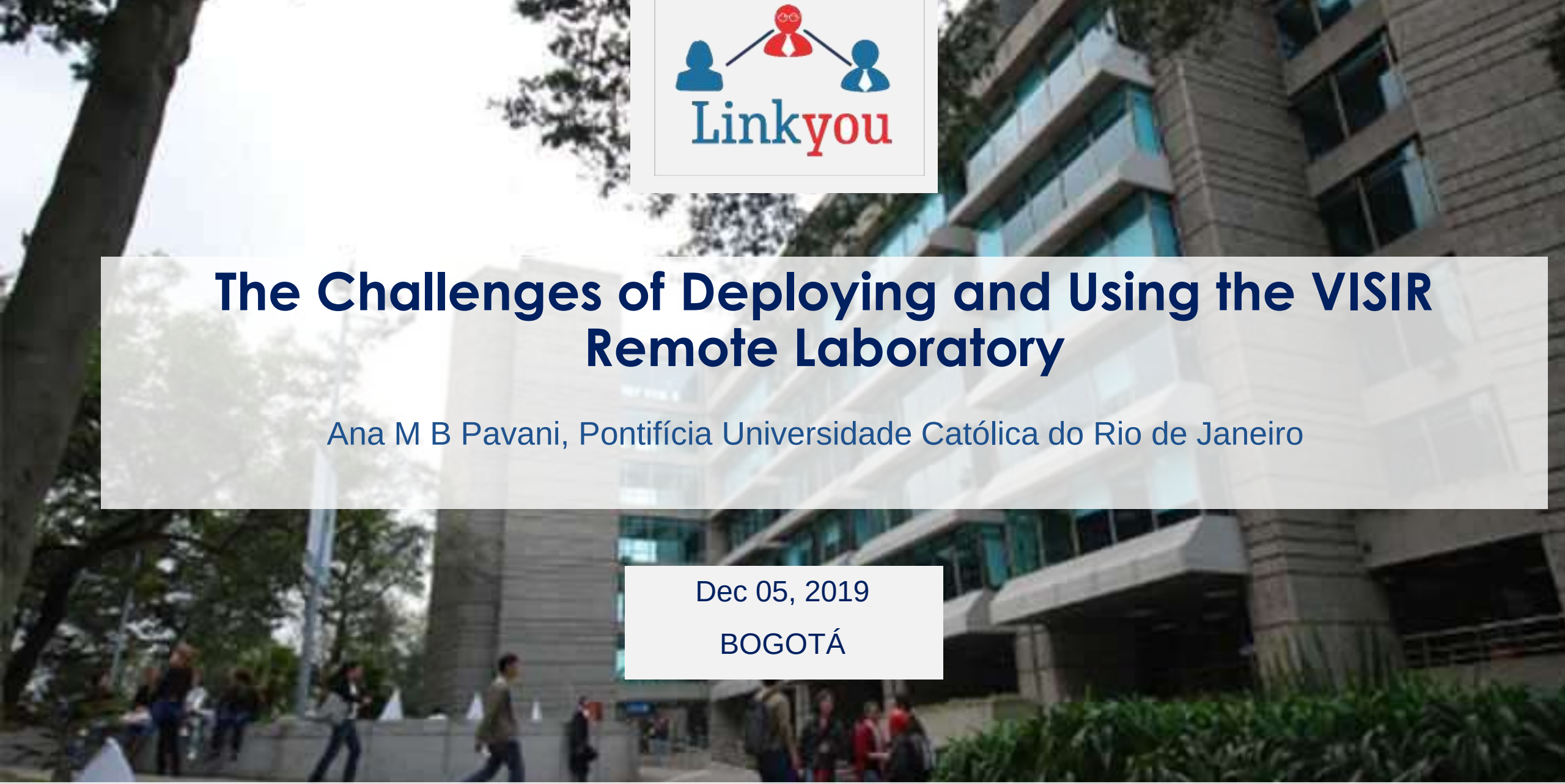

The Challenges of Deploying and Using the VISIR Remote Laboratory

Ana M B Pavani, Pontifícia Universidade Católica do Rio de Janeiro

Dec 05, 2019

BOGOTÁ

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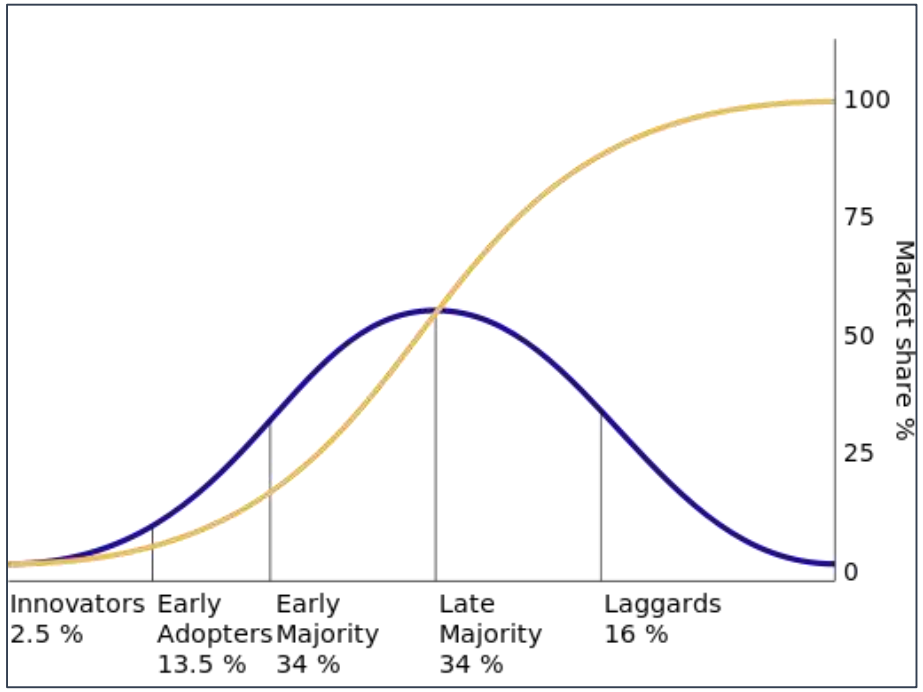
Innovation

EM Rogers in his book Diffusion of Innovation presented a curve with the percentages of types of adopters of innovations:



Rogers'Curve for the diffusion of innovation available in Public Domain at https://commons.wikimedia.org/wiki/File:Diffusion_of_ideas.svg

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Why Start with Innovation?

Because deploying and using VISIR was an innovation in learning and teaching engineering at PUC-Rio.

And What Does VISIR Mean?

Virtual **I**nstrument **S**ystems **i**n **R**eality.

And What Is VISIR?

VISIR is Remote Lab – this means that is a Real Resource with Remote Access.

According to Heradio et al., there exist the following possibilities: (1) Real Resource with Remote Access; (2) Real Resource with Local Access; (3) Virtual Resource with Remote Access; and (4) Virtual Resource with Local Access.

How Did We Get VISIR?

VISIR came to PUC-Rio through the VISIR+ Project partially funded by the European Comission (grant 561735-EPP-1-2015-1-PT-EPPKA2-CBHE-JP).

The participants in the project were one Swedish university (where VISIR was developed), one Austrian university, two Spanish universities, one Portuguese university (leader of the project), three Brazilian universities and two Argentinian universities.

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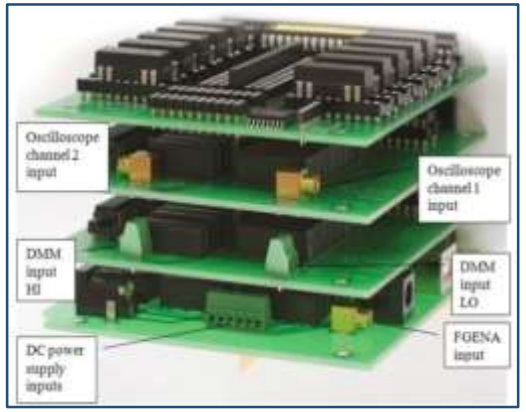
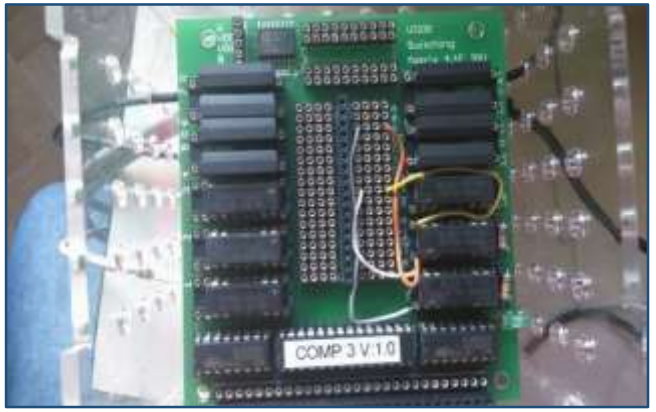
Real Resource





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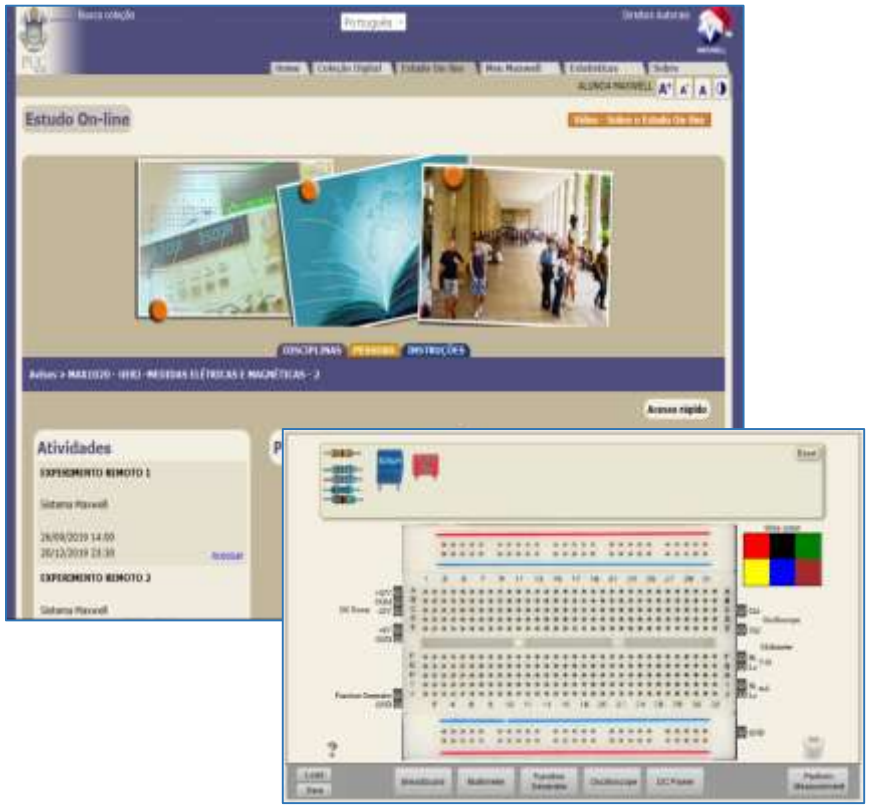
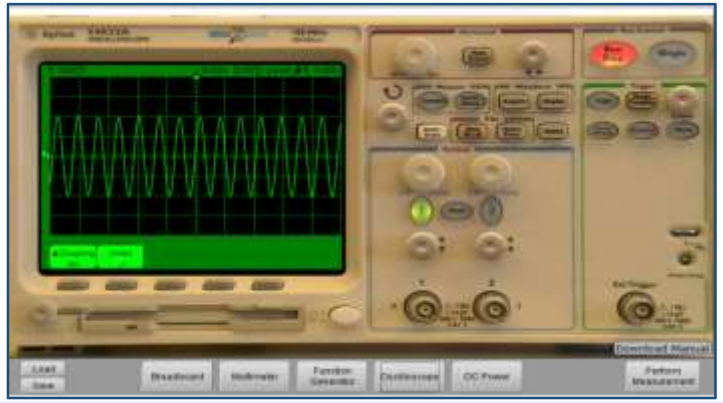
Remote Access





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Who Were the Team Members of This Project?

The group of faculty members (innovators in Rogers' curve) who have been working with Information and Communication Technology supported learning in engineering.

What Had Been Done Before VISIR?

- There is a long timeline that goes back to 1995.
- The highlights in this time line are:
  - The development of the Maxwell System (www.maxwell.vrac.puc-rio.br) that is the integration of an LMS – Learning Management System, an IR – Institutional Repository and, after VISIR, a service broker for Remote Labs. Users can "walk" from one environment to the other with seamless transitions.
  - The integration of SciLab (www.scilab.org) into the platform to allow simulations to be performed "wraped" in hypermedia learning objects.
  - The development of over 500 OER – Open Educational Resources easily availablefrom an aggregator.
  - The development of an aggregator to all contents related to Electrical and Control & Automation Engineering – besides OER, there are ETD – Electronic Theses & Dissertations, Senior Projects, articles, external links to sites/repositories of interest etc.

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What Had Been Done Before VISIR? (cont'd)

- The highlights in this time line are:
  - The offer of undergraduate and graduate courses in the blended learning (b-learning) mode.
  - The implementation of a Research Data collection.

What Has Been Done After VISIR?

- Development of a collection of podcasts.
- Development of apps (one published so far and two – using Augmented Reality on their way).
- Offer of more b-learning courses.
- Offer of one distance learning course (e-learning) starting next March.

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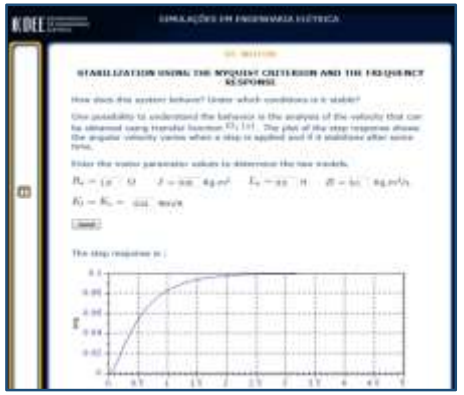
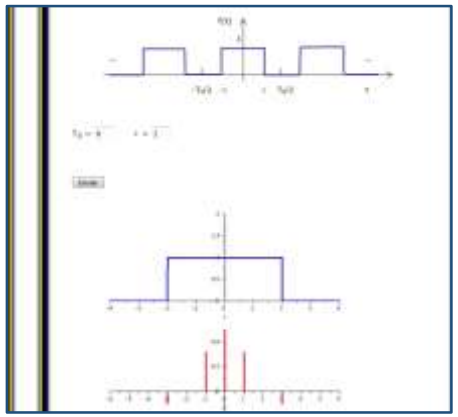
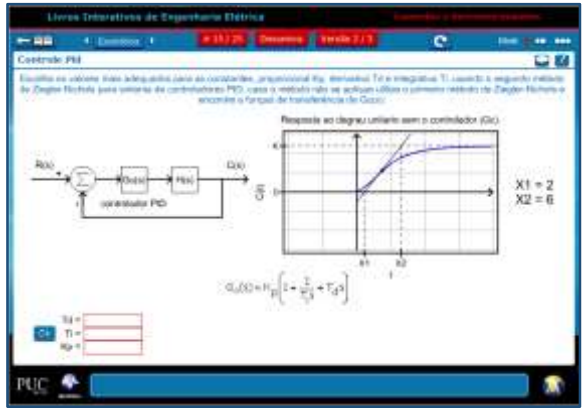
Some Screen Shots…







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What Were the Challenges in the Title?

- Master the use of the equipment – there was a good help from the European universities.
- Integrate VISIR to the Maxwell System in order to provide a seamless migration between environments and use all infrastructure the platform offers in terms of users and contents management.
- Identify courses that could be potential users of VISIR.
- Identify instructors to be potencial users (early adopters in Rogers' curve) of the equipment – additional work was necessary.
- Define and create all contents, both technical and educational, that were necessary to support the use by students. The contents can be found in Open Access at Resources (www.maxwell.vrac.puc-rio.br/projetosEspeciais/VISIR/resources.html) of the small VISIR+ websire (www.maxwell.vrac.puc-rio.br/projetosEspeciais/VISIR/index.html).
- Run VISIR in three courses (Introduction to Engineering – Electric Engineering, Electric & Electronic Circuits and General Electricity) and analyze results.
- Implement the necessary fixes.

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What Were the Results?

- Stop the use in Introduction to Engineering – the instructors and the TAs left the course and the other team did not belong to the "early adopters" group.
- Change the use in Electrical & Electronic Circuits – the additional work for students was too big. Each experiment had three steps – theoretical analysis, simulation using CIrcuitLab (www.circuitlab.com) and performing it in the traditional lab. The fourth step became the use of VISIR between simulation and workbench. The decision was to keep VISIR in some experiments that do not have the workbench activity anymore.
- Maintain the same use in General Electricity – a real case of success. The over 100 students each term who could perform 8 experiments now perform 12.
- Implement two new remote labs (artifacts created at PUC-Rio) for Control Systems.

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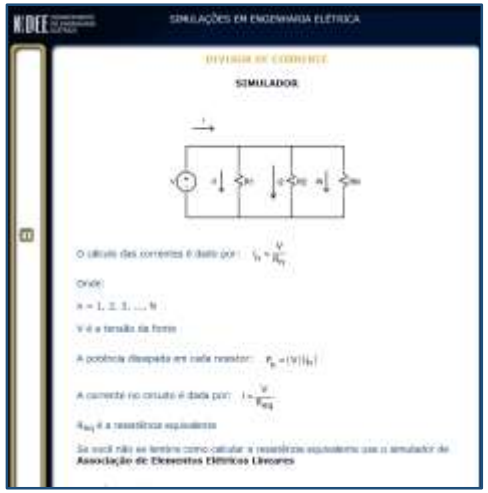
More Screen Shots…



Visit Our Small VISIR Website

www.maxwell.vrac.puc-rio.br/projetosEspeciais/VISIR/index.html

Aknowledgements

The VISIR team at PUC-Rio is very grateful to the VISIR team at CUAS – Carinthia University of Applied Science for its goodwilled lending of the equipment and competent support in the process of installation.

The VISIR+Project was funded by the European Commission through grant 561735-EPP-1-2015-1-PT-EPPKA2-CBHE-JP.The PUC-Rio team is gratefulfor this opportunity of having VISIR and being part of such important project.