

Redes semânticas de documentos de CTI

Survey *Futures Literacy*
Scenarios **Trend Analysis**
Text Mining *Roadmapping*
Causal Layered Analysis **Risk Evaluation**
Monitoring **Data Mining**
SWOT *STEEP* *Multicriteria Analysis*
Technology Readiness Assessment
Backcasting **Network Analysis**
Expert Pannels *Patent Analysis*
Bibliometric Analysis *Weak Signals*

Complex

[adj., v. kuh m-pleks, kom-pleks; n. kom-pleks]

–adjective

1.
composed of many interconnected parts; compound; composite: a complex highway system.

2.
characterized by a very complicated or involved arrangement of parts, units, etc.: complex machinery.

3.
so complicated or intricate as to be hard to understand or deal with: a complex problem.

Fonte:
Dictionary.com

Complexity, a **scientific theory** which asserts that some systems display behavioral phenomena that are completely inexplicable by any conventional analysis of the systems' constituent parts. These phenomena, commonly referred to as emergent behaviour, seem to occur in many complex systems involving living organisms, such as a stock market or the human brain.

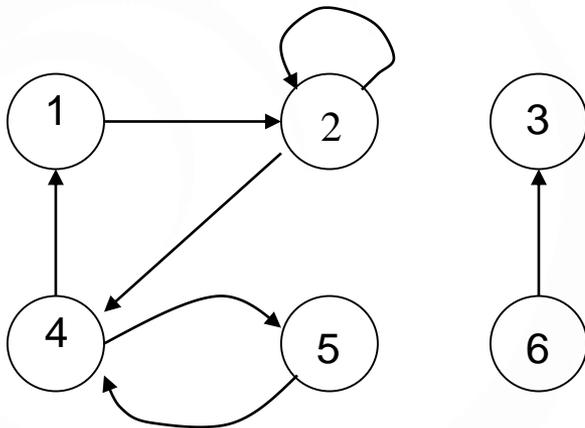
Fonte: *John L. Casti, Encyclopædia Britannica*

Complexity

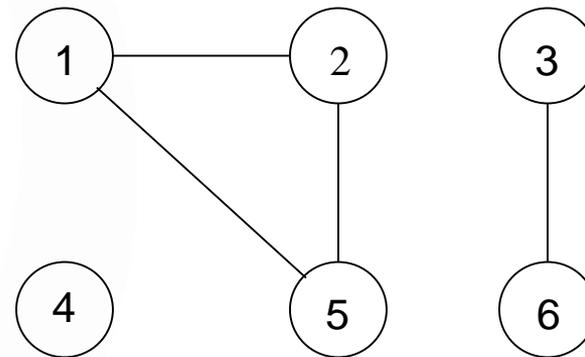
Hipótese de trabalho:

Inerente a cada sistema complexo existe uma **rede** que descreve as relações entre seus componentes.

- ◆ Rede = grafo
- ◆ Um grafo é um conjunto de nós conectados por um conjunto de arestas



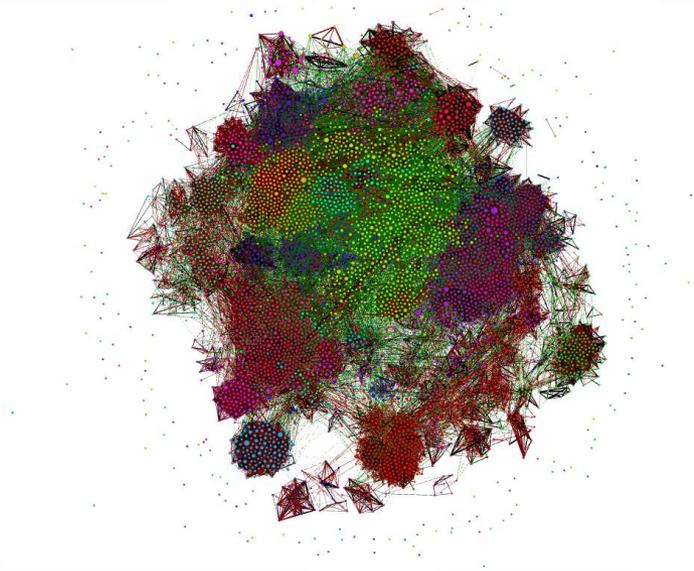
Rede direcionada



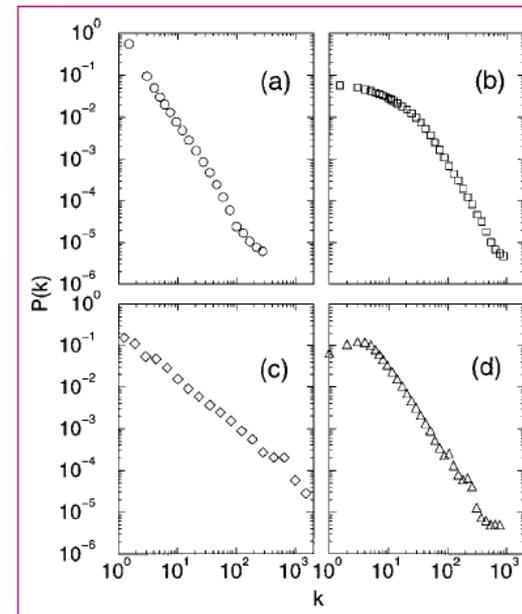
Rede não-direcionada

Redes complexas reais

- Componente conectado gigante
- Distribuição de arestas do tipo lei de potência (scale-free)
- *Small-world*
- Existência de comunidades de nós densamente interconectados



6500 pesquisadores de 120 INCTS



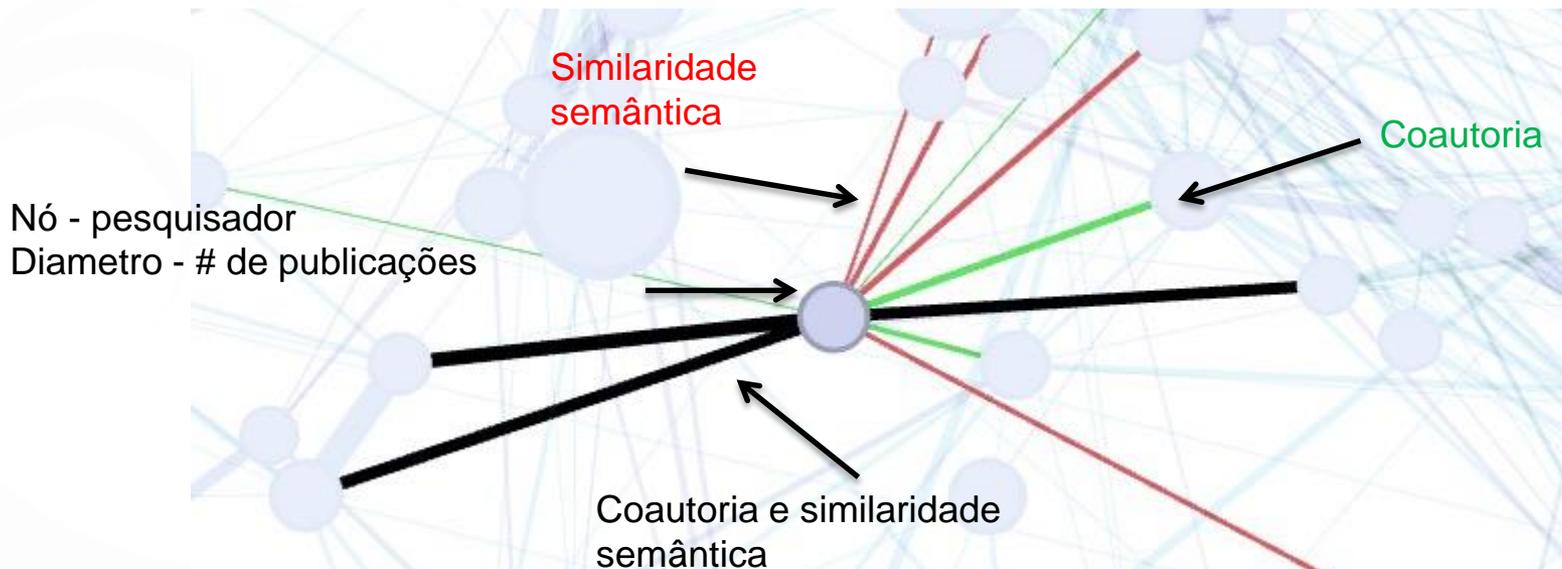
Fonte Albert Barabási

Duas entidades são conectadas se:

- ◆ Têm ligações simbólicas ou físicas
- ◆ Realizam os mesmos tipos de ações
- ◆ Dividem antecedentes
- ◆ Possuem características comuns
- ◆ Ligam-se a entidades comuns
- ◆ Realizam transações entre si
- ◆ São referidas como um par
- ◆ Referem-se a significados comuns
- ◆ Combinações das alternativas acima

Análise de redes no CGEE

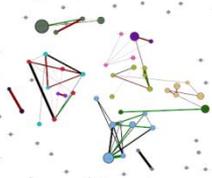
Fonte: Lattes
Redes de coautorias
Redes de similaridade semântica



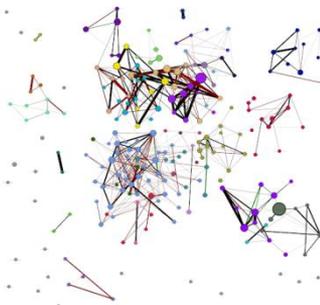
Capacidade atual – 30 mil currículos por extração

Evolução de grupos/áreas de pesquisa

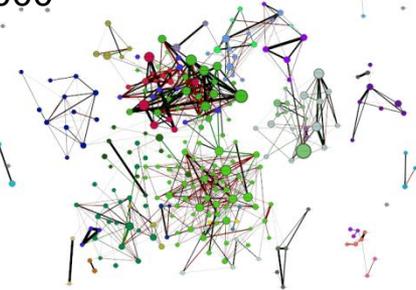
1982



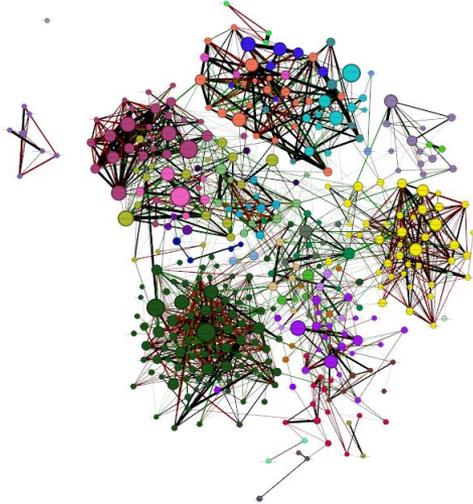
1990



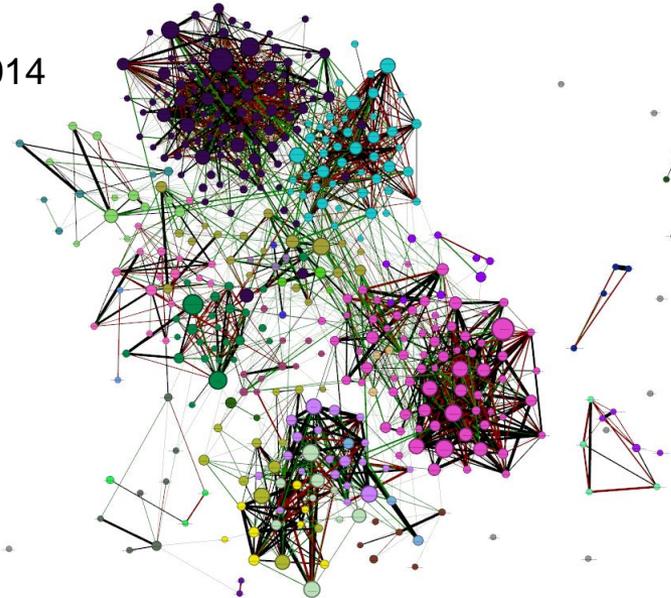
2000



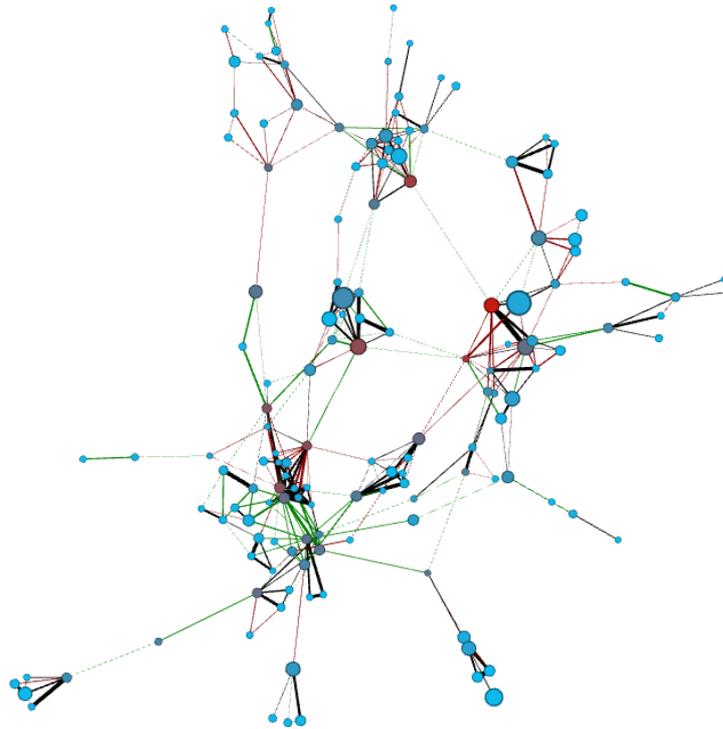
2010



2014

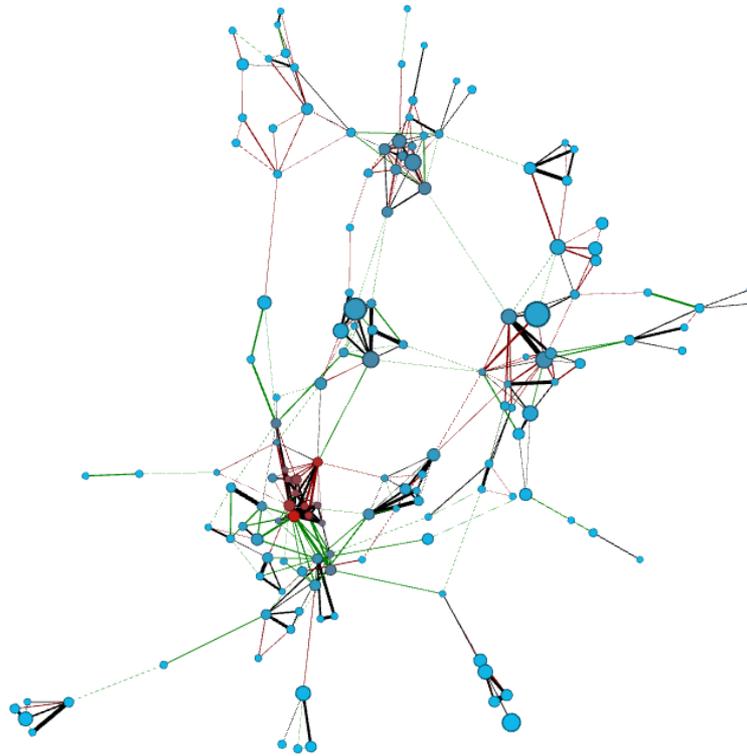


Melhor identificador de coordenadores de INCTs



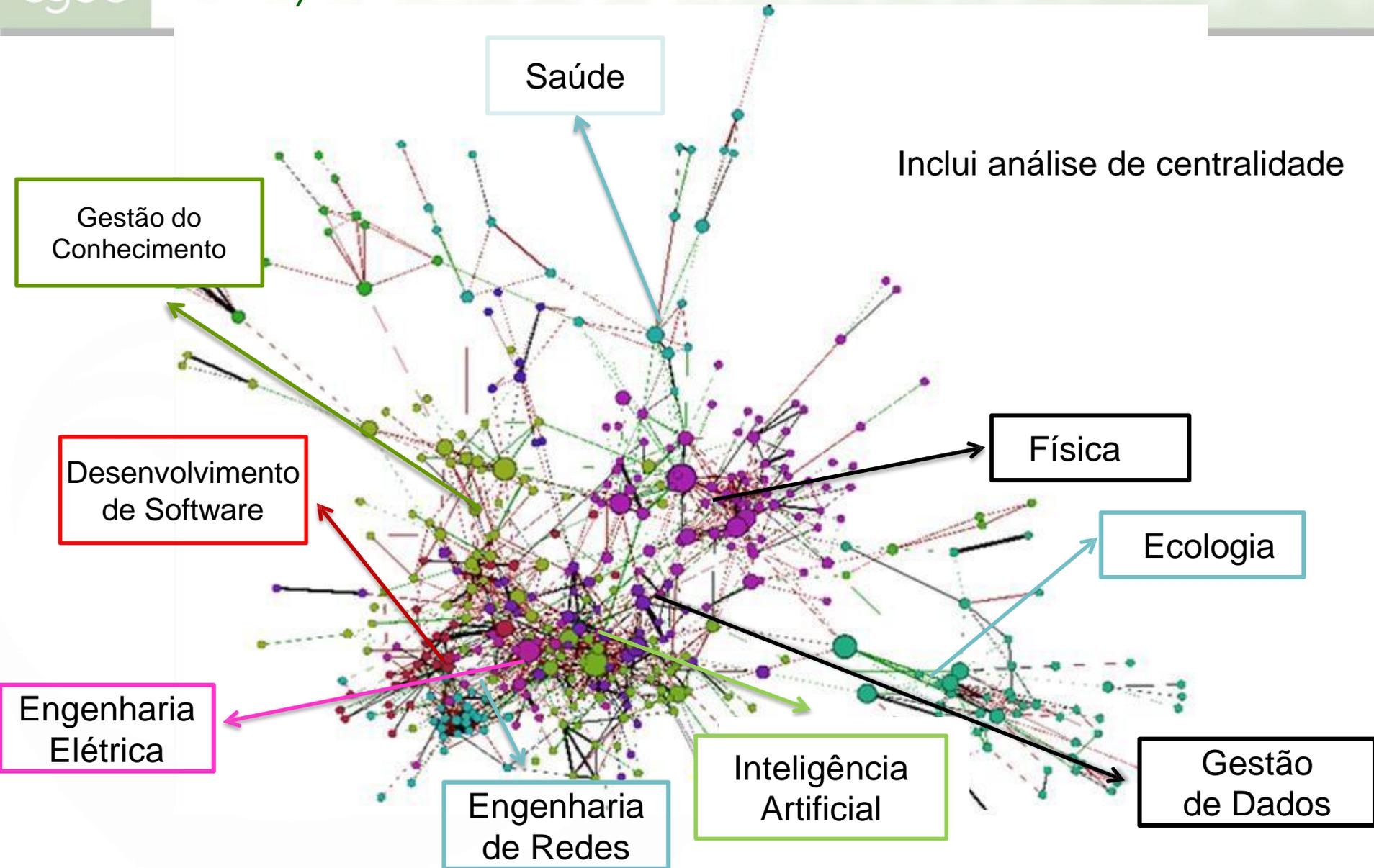
Identificação de atores com potencial de assumir o papel de pontes em redes

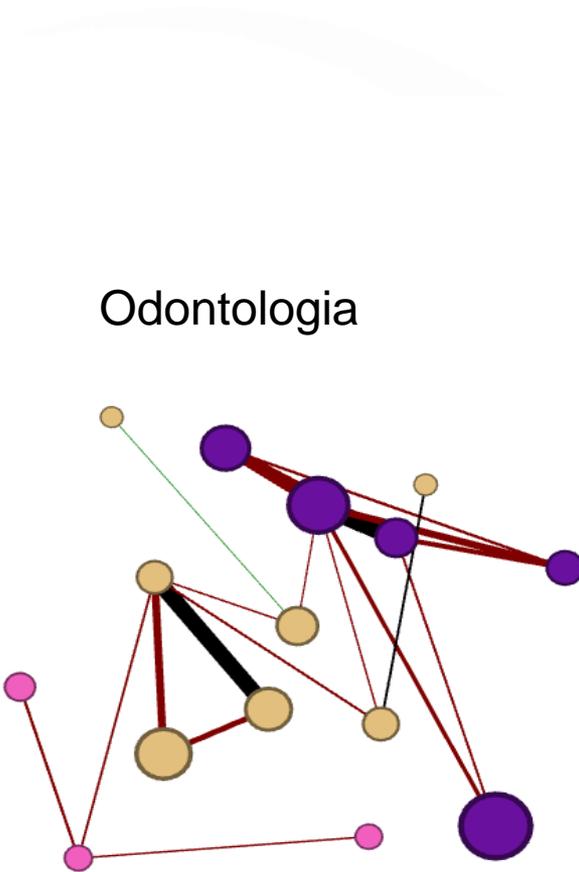
Análise de centralidade: eigenvector



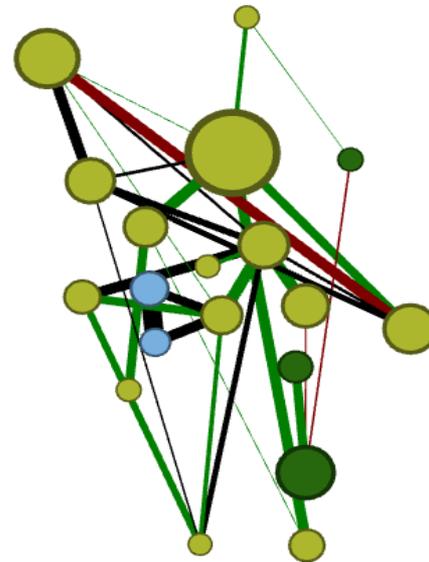
Pesquisadores com produção mais representativa **no contexto da rede**, mas há controvérsias

Mapeamento de competências (área de pesquisa: redes)



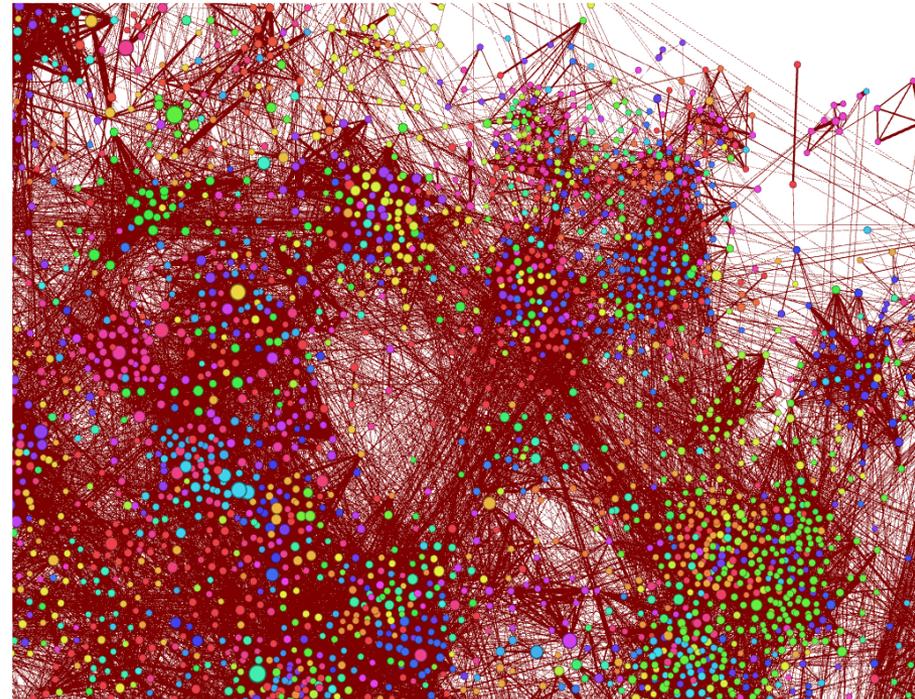
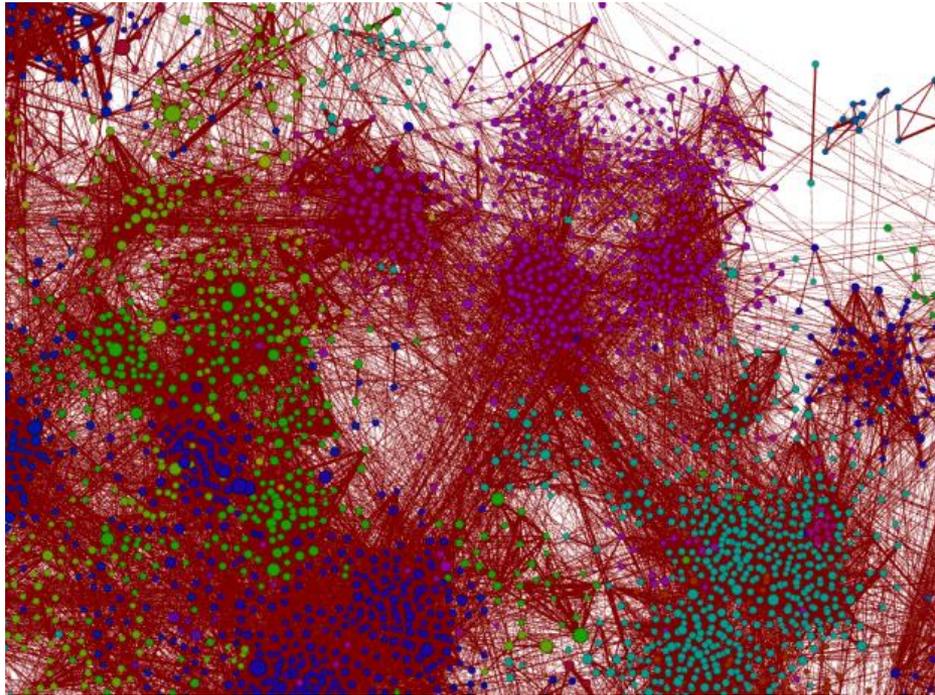


Química/Engenharia Química



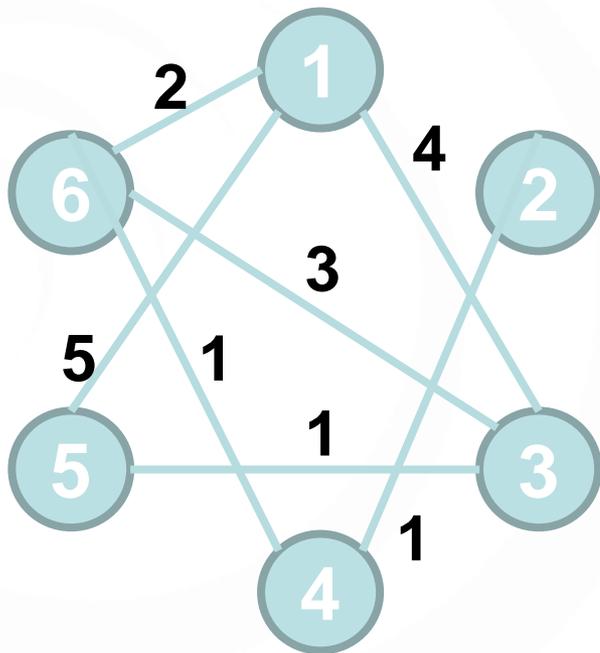
Redes de similaridade semântica (cosseno)

Redes de pesquisadores agrupados por INCT e por modularidade



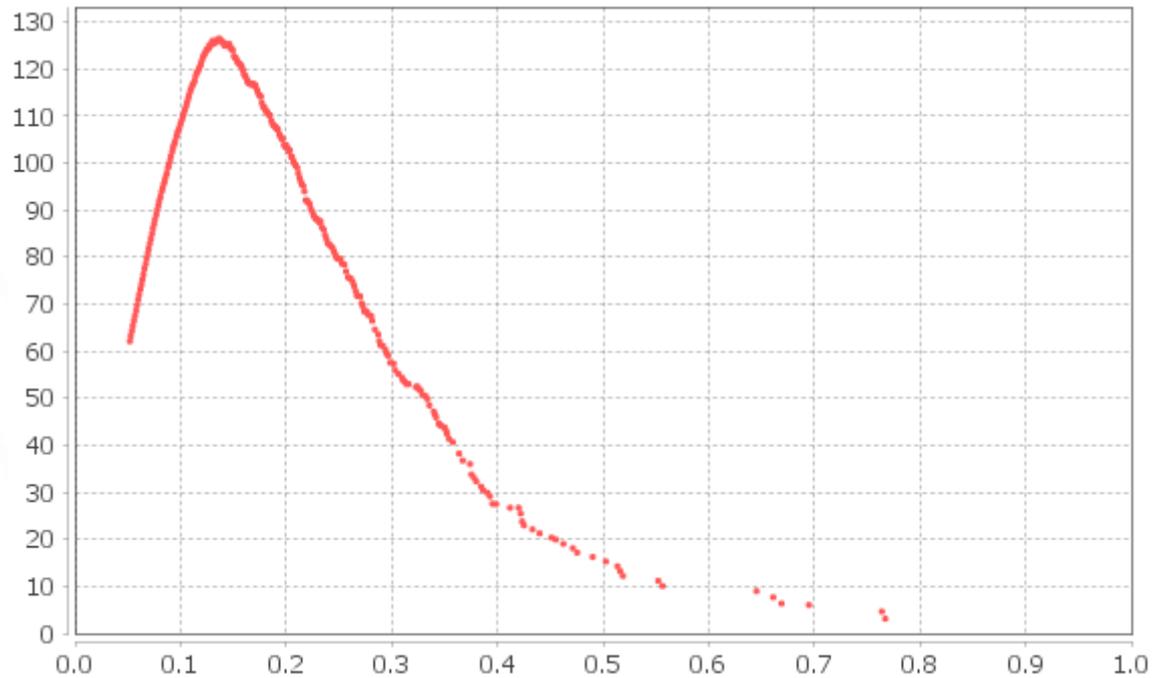
O lado esquerdo mostra grupos temáticos identificados (por cores) pelo algoritmo de modularidade de uma parte da rede completa. No lado direito, cada cor representa um INCT diferente.

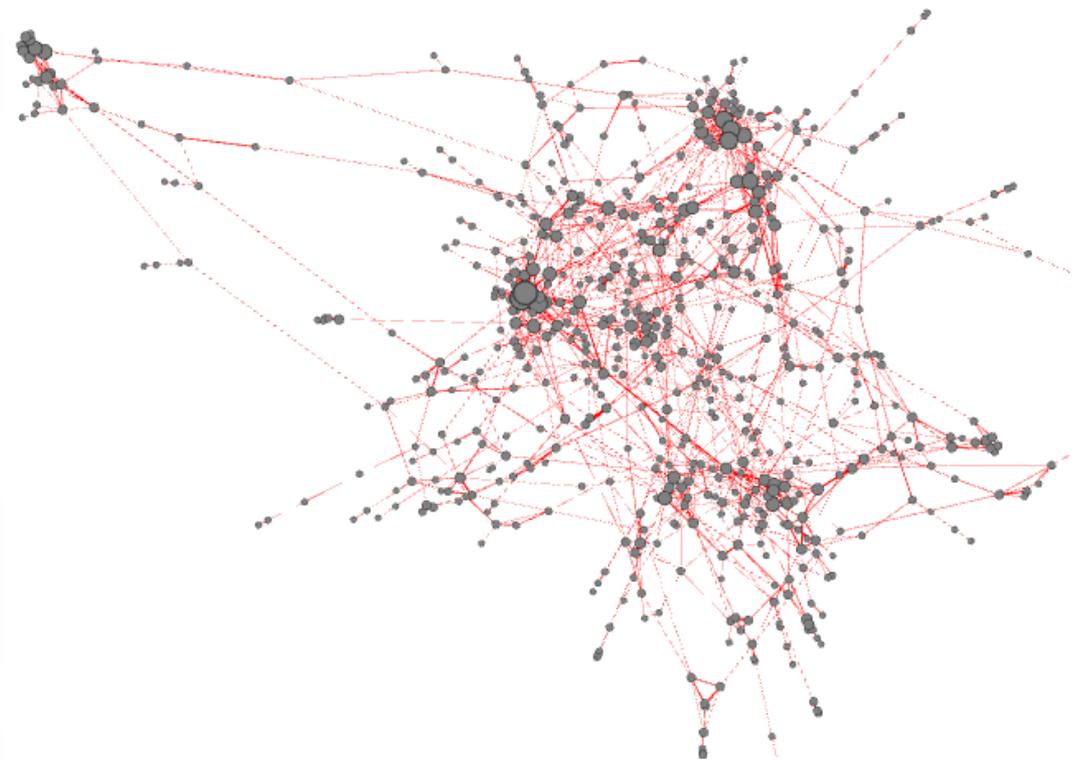
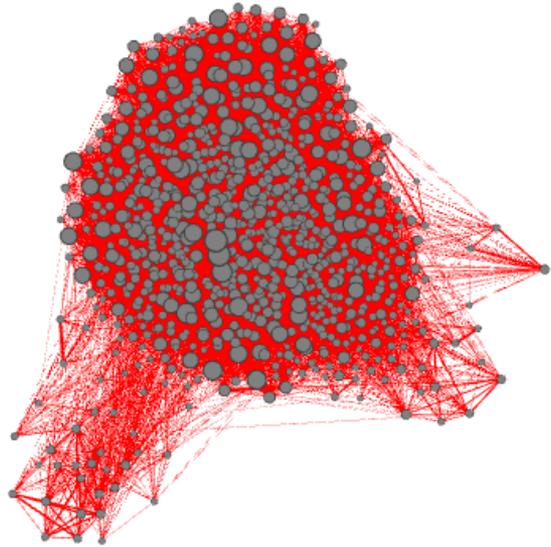
Cossenos tf.idf



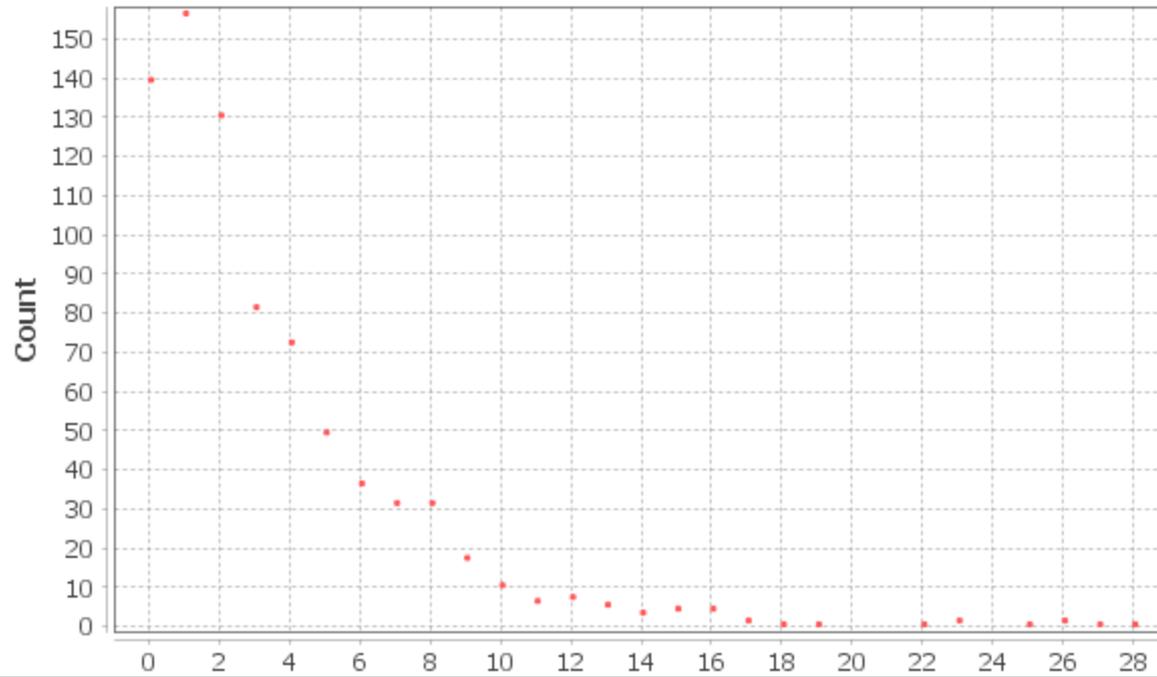
$$\begin{pmatrix}
 0 & 2 & 4 & 1 & 5 & 1 \\
 2 & 0 & 3 & 1 & 0 & 0 \\
 4 & 3 & 0 & 1 & 0 & 0 \\
 1 & 1 & 1 & 0 & 0 & 0 \\
 5 & 0 & 0 & 0 & 0 & 0 \\
 1 & 0 & 0 & 0 & 0 & 0
 \end{pmatrix}$$

Cutoff de similaridade de cosseno





Degree Distribution



Obrigado

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