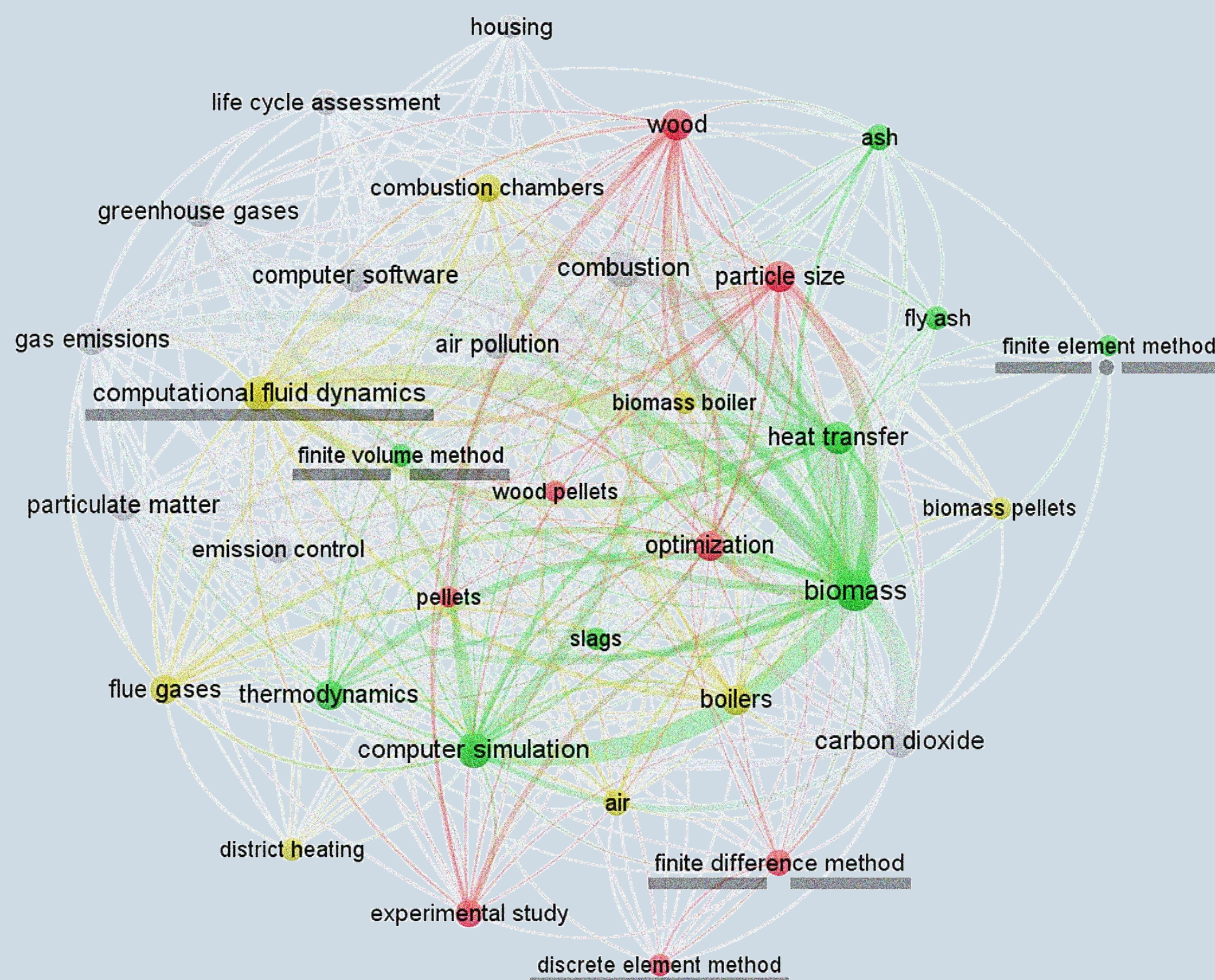


Modelling of the biomass combustion process can be based on two sets of methods recognised in the scientific environment

Three basic methods (finite volume method (FVM), finite difference method (FDM) and finite element method (FEM)) used in the combustion process mathematical modelling context were identified. Two sets of methods are formed from these methods – **Computational fluid dynamics (CFD)** and **Discrete element method (DEM)**.

Conversely, the most popular programmes used to perform related mathematical modelling are **ANSYS Fluent** (based on CFD) and **XDEM** (based on DEM).

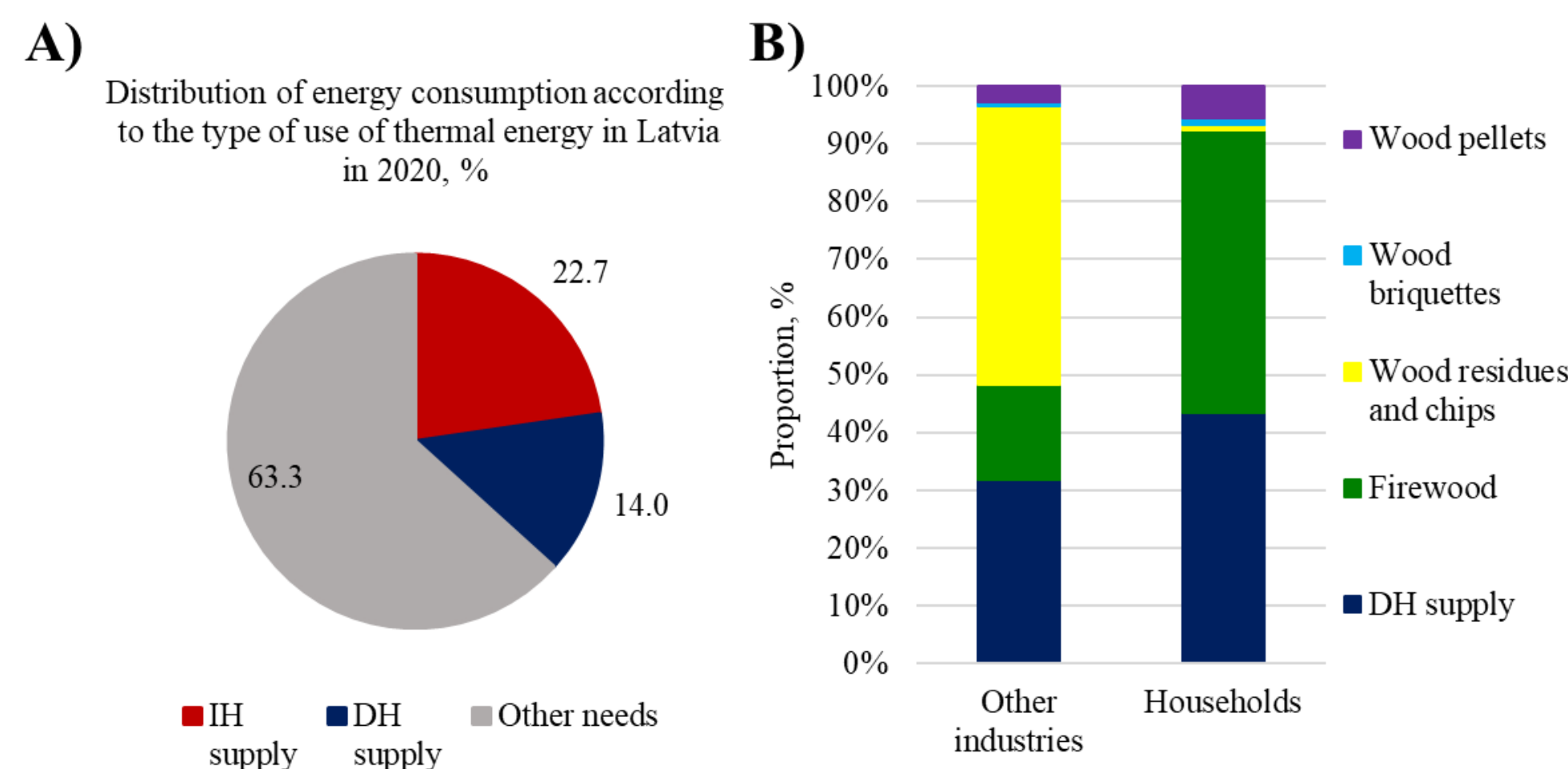
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Keyword co-occurrence network (SMA results)

Introduction

Diversification of energy resources is a current objective that several countries want to achieve, including in northern Europe. **Demand for wood fuels** in Latvia is high, which is reflected in consumer expenditure.



Distribution of thermal energy and energy carriers in the national economy of Latvia

(A – total breakdown; B – share of wood biomass in households and other sectors)

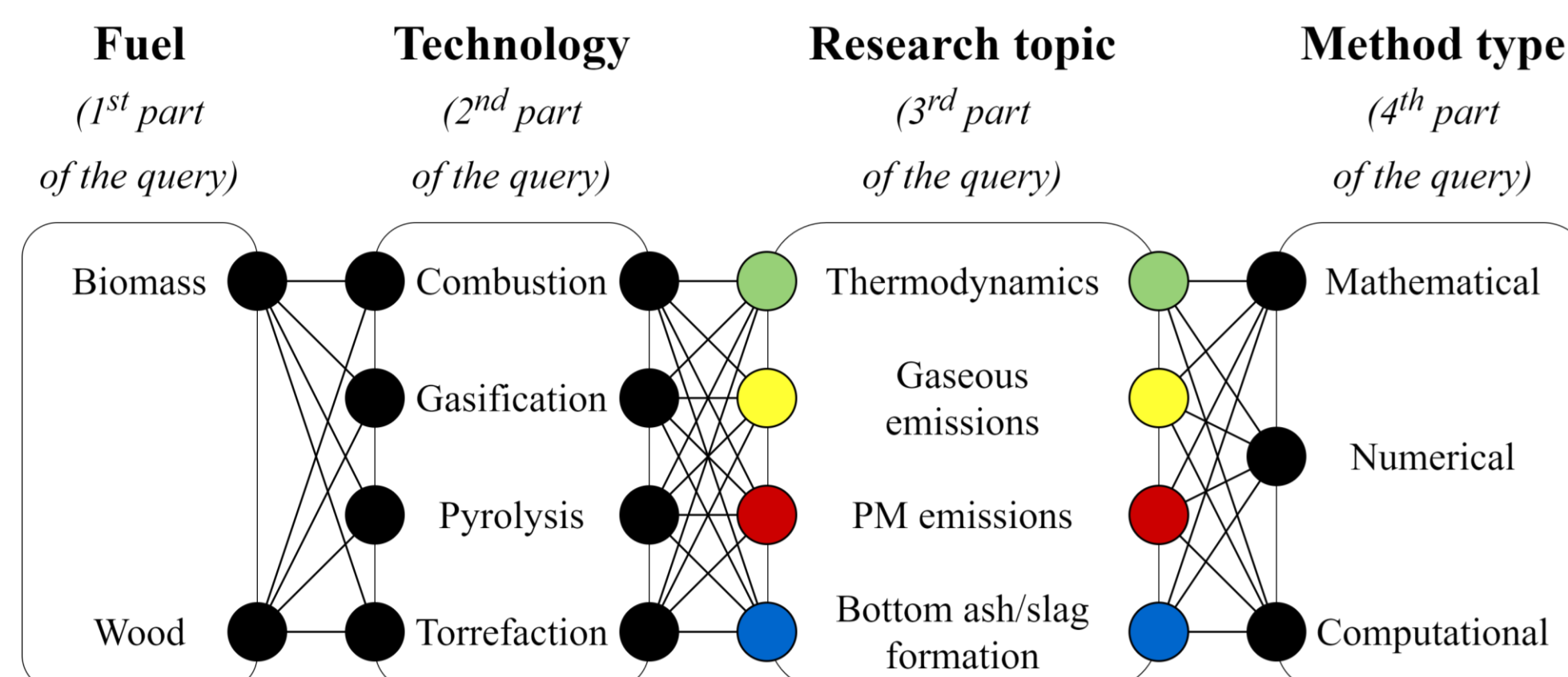
Using **low-quality biomass (LQB)** to produce fuel pellets for market stabilisation is possible. LQB pellets can theoretically and practically be used in **low-capacity solid fuel boilers** to provide different types of individual heating systems with an alternative energy source.

Experimental research and **mathematical modelling** can be carried out to determine how effective the combustion of LQB pellets are. Planning and conducting appropriate experiments is a familiar process, but successful modelling requires exploring the topic and understanding what methods and programs can be applied.

Bibliometric analysis was used for this purpose.

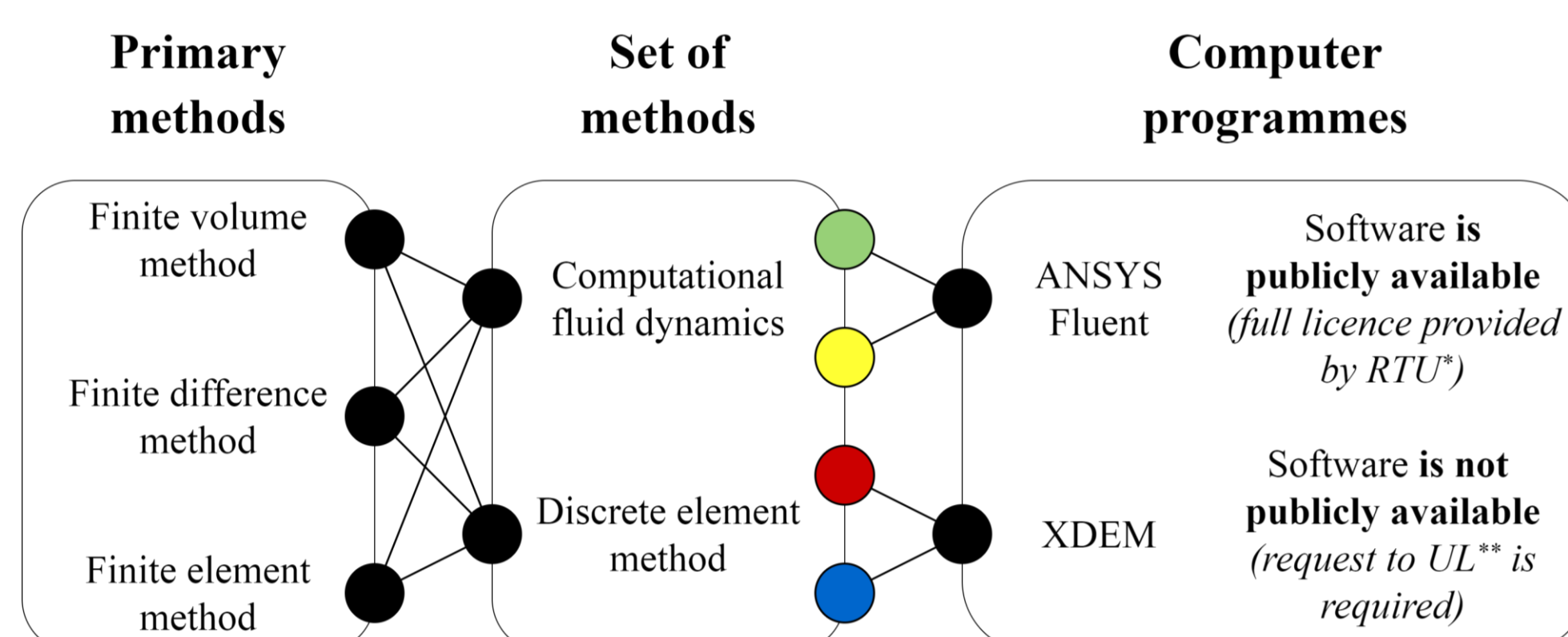
Methodology and results

The experience-based algorithm and *Scopus* scientific database were used to perform the research. Queries were designed to find the methods used to **simulate processes** related to **thermodynamics**, **gaseous emissions**, **fly** and **bottom ash** (including **slag**).



Query-making algorithm

The **Scientific mapping analysis (SMA)** made it possible to identify main topic-related keywords. The first set of keywords refers to appropriate methods and helped to find modelling programmes using them. The second set of keywords refers to additional factors to be taken into account when investigating the solid fuel combustion process through a modelling approach, e.g., optimisation and validation.



The algorithm for obtaining the results of the study based on bibliometric analysis