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ENERGY MODES OF A THREE-SECTION INDUCTOR FOR HEATING ALUMINUM

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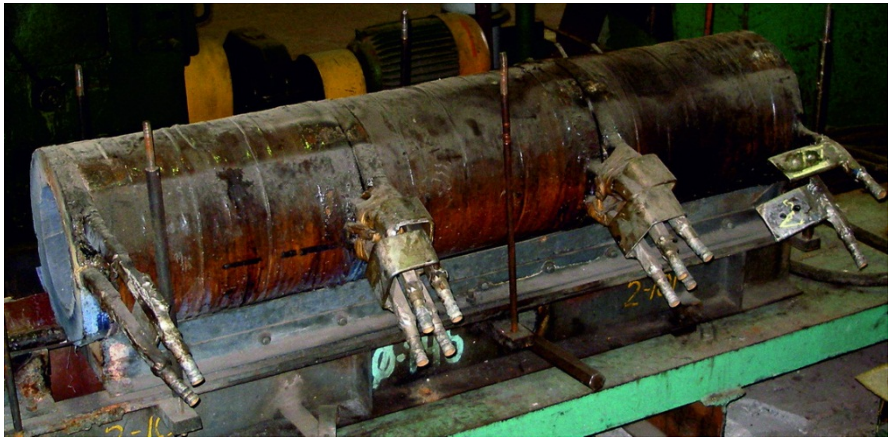
General view of a three-section inductor


Induction heater windings




Three-section induction heater assembly

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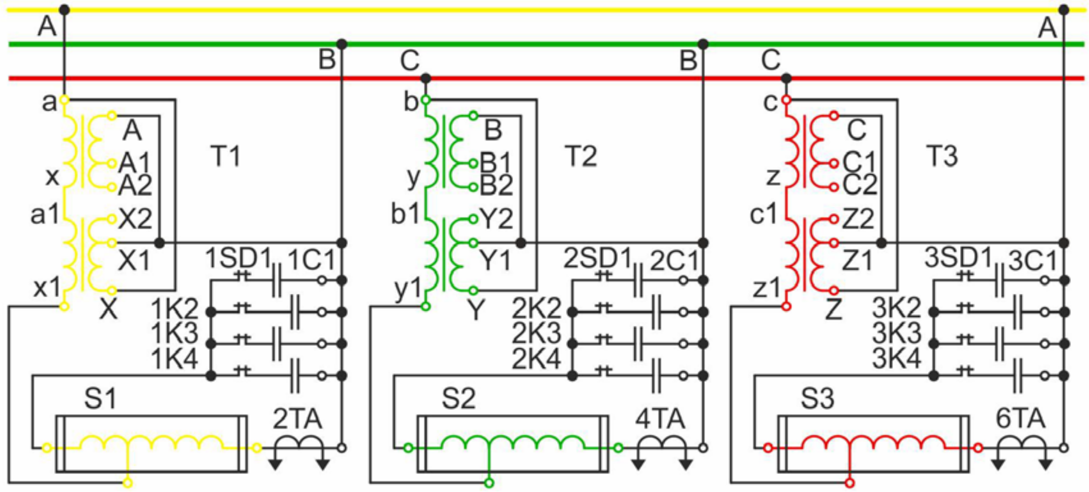
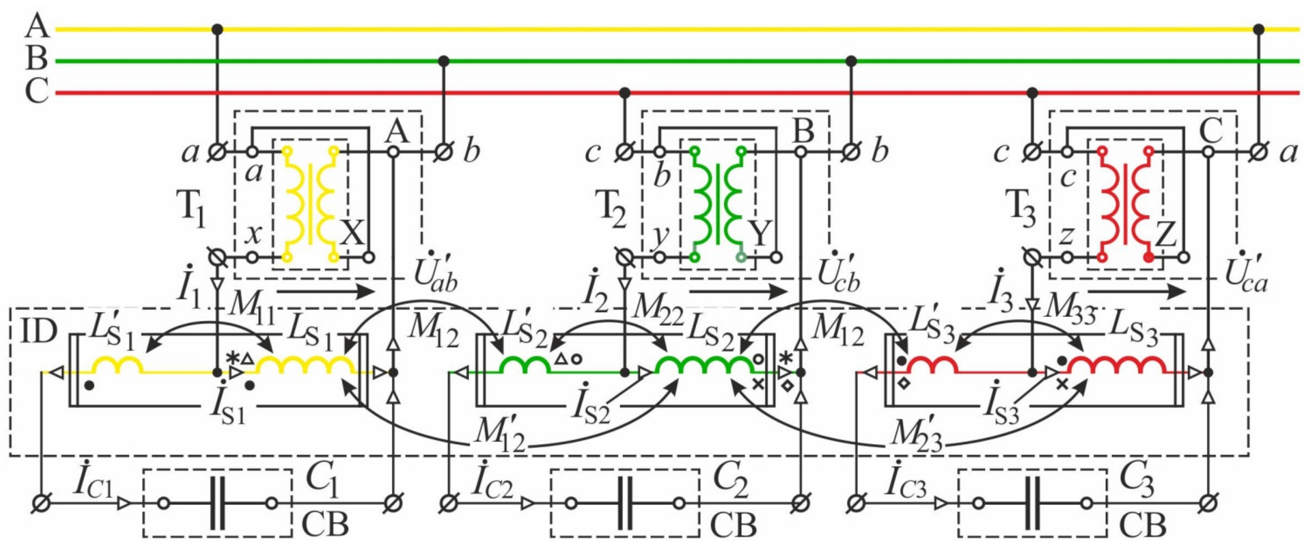
Initial diagrams of a three-phase induction device



Simplified schematic diagram of a three-phase inductor connection



Calculation diagram of a three-phase induction heater

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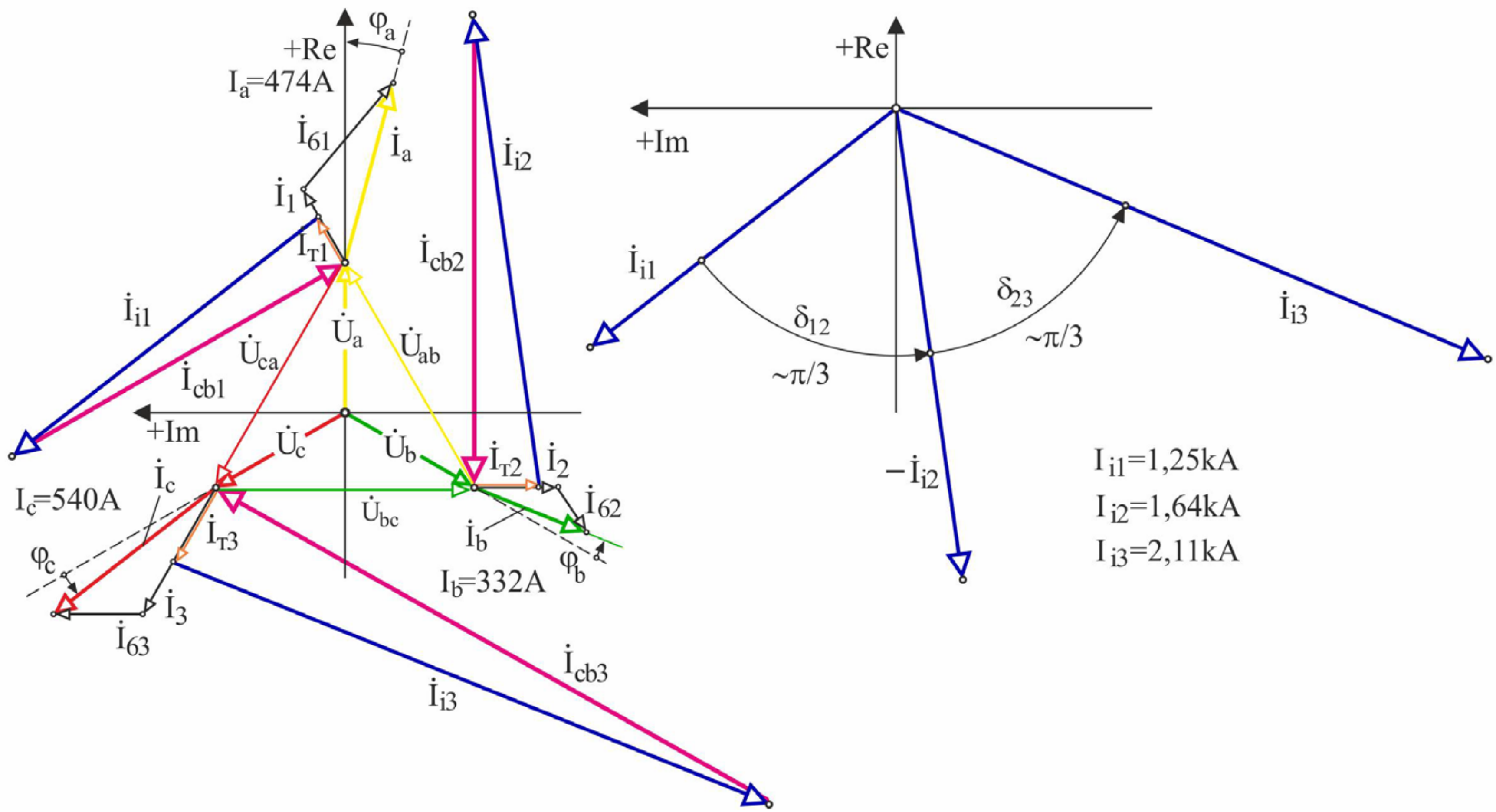
Results of calculations and modeling of the initial version



Vector diagram of a three-phase induction device

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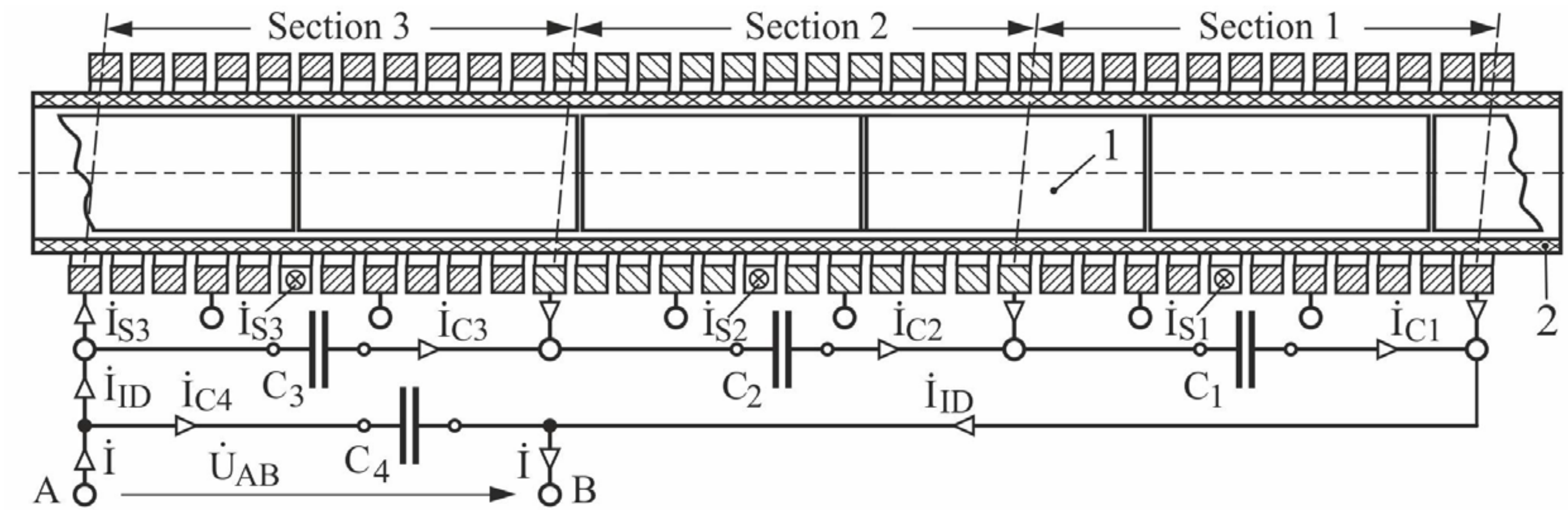
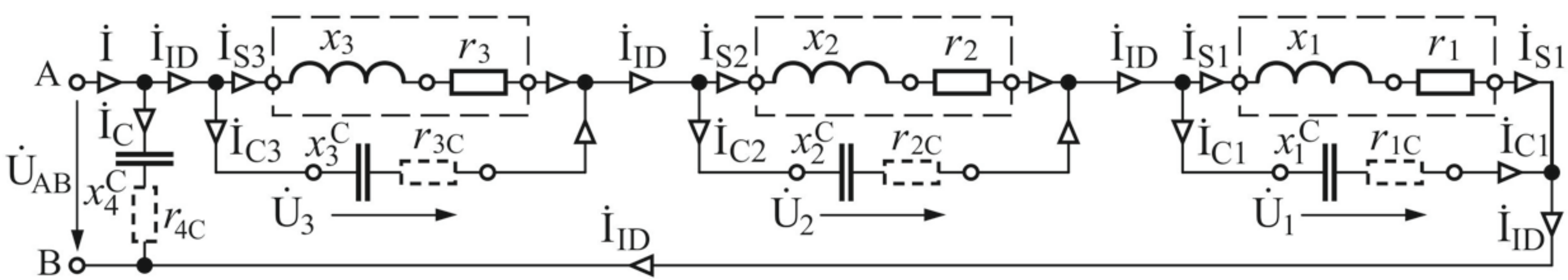
Schematic solution for a three-section inductor



Connection diagram of the sections of a single-phase induction heater



Simplified equivalent circuit of a single-phase induction device

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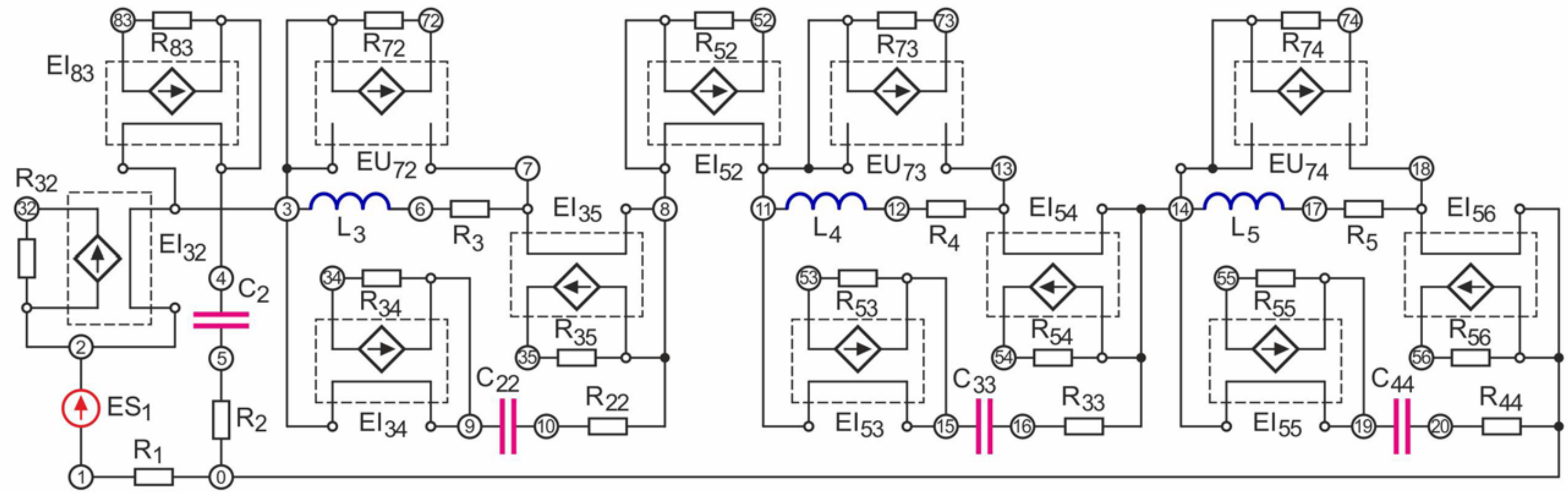
Calculation and simulation results



Simplified schematic model of a single-phase induction device

Index k	C_4	C_3	C_2	C_1	C_4	S_1	S_2	S_3
P_k, kW	0,18	1,27	0,85	0,42	0,18	117,38	75,10	42,25
Q_k, kvar	112,48	352,19	168,92	70,42	112,48	352,13	225,30	126,75
S_k, kVA	112,48	352,193	168,921	70,418	112,48	371,18	237,49	133,61

Calculation results of a single-phase induction device

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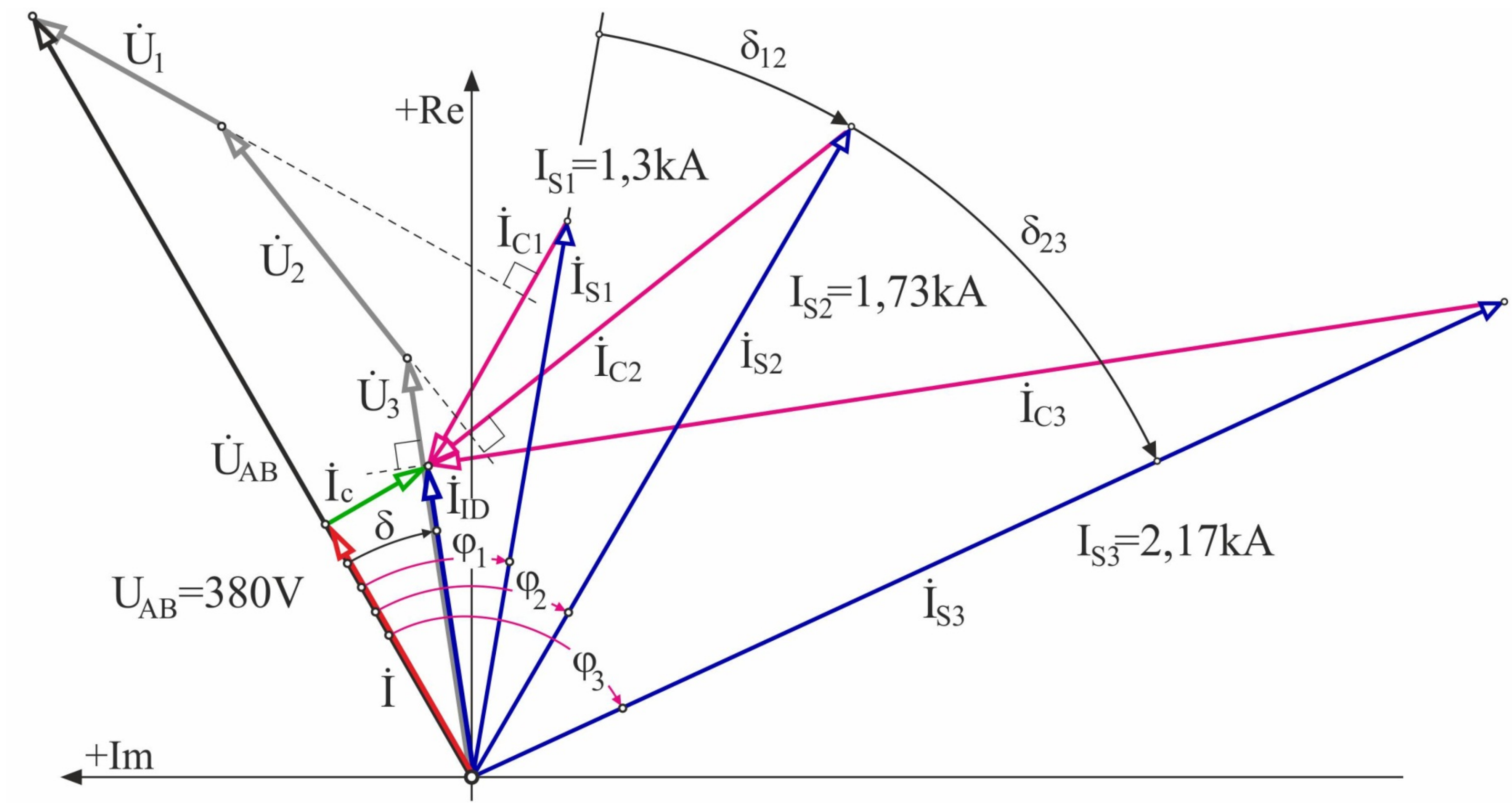
Calculation and simulation results



Vector diagram of the mode of a single-phase induction device

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Conclusion

Energy modes of a three-section inductor for heating aluminum

Project results

Simulation of the power supply system
A new inductor connection diagram is proposed
A profitable economic solution was obtained

Advantages

Excluded expensive booster
Cheap low-voltage capacitor banks are used
Reduced phase shift of currents in sections
Improved conditions for heating blanks at the joints of sections
Increased productivity of the induction unit

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