

## Plenary Lectures



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**Title** Research and Application of Advanced Control Equipments and Systems

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**Abstract :**

Control equipments and control systems are the nerve centers, operations centers, and security barriers of the modern industrial equipments and of the major projects in the areas of metallurgy, energy, chemicals, defense and so on. However, for a long time, the advanced control equipments used in national major equipments and major projects mainly rely on foreign developed countries. The control system development lag is one of the key reasons why the Chinese industry is large but not strong, which brings potential threat to the national economic security and industrial security. Facing the national needs, after a decade of technology development and applied research, our research group has solved the four key problems of high security, high reliability, high adaptability, and large scale, and made significant innovations to establish successfully the design and development core technologies for developing advanced control equipments and systems with independent intellectual property. These core technologies can be classified as the software technologies for advanced control equipments and systems, the hardware technologies for advanced control equipments and systems, and the advanced control and optimization technologies for advanced control equipments and systems. The project achievements have been successfully applied to more than 2500 units in the large-scale blast furnace TRT equipments, air separation plants, thermal power plants and other industrial equipments. The customers include the famous largest of 5000 cubic meters of blast furnace in China Baosteel Group, and the largest 5250 cubic meters of blast furnace in Korea Hyundai Steel Group. The technical performance indicators surpass the foreign mainstream systems and achieve the leading level of similar technology. The advanced control equipments and systems have the international market competitiveness, and have been exported to USA, Germany, Japan, Korea and other foreign countries. We have obtained 65 patents and 30 software copyrights, published 108 SCI&EI papers and 4 books. In the nearly three years, output value of 18.91 billion yuan and economic benefit value of 7.29 billion yuan were created. Meanwhile, significant social benefits were also generated for promoting energy conservation and emission reduction.