

INTERNATIONAL ASSOCIATION FOR HYDRAULIC
RESEARCH

Analytical Modeling of Core Hydraulics and Flow Management in Breeder Reactors
(Seminar #4, Mathematical Models for Internal Flows in Nuclear Power Stations)

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SYNOPSIS

An analytical model representing the hydraulic behavior of the primary system of fast breeder nuclear reactors is discussed. A computer code capable of detailing the core flow distribution and characterizing the flow and pressure drop in each reactor component is presented. Application of this method to the reactor core thermal-hydraulic design has allowed optimization of the flow management with consequent upgrading in performance, reduction of unnecessary conservatism and very substantial cost savings. Typical quantitative examples are presented.

RÉSUMÉ

Un modèle analytique représentant le comportement hydraulique du circuit primaire des réacteurs surrégénérateurs est débattu. C'est présenté aussi un code de calcul capable de prédire en détail la répartition du réfrigérant dans le cœur et capable de caractériser l'écoulement et les pertes de charge en chaque composant du réacteur. L'application de cette méthode au projet thermo-hydraulique du cœur a permis de optimiser la distribution du réfrigérant et consequentement améliorer la performance, réduire les limites trop excessives et reduire très sensiblement les coûts. Quelques exemples typiques sont présentés quantitativement.

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