

Advanced code coupling interface tool

CONCORS is Studsvik's system code coupling tool for linking system codes leveraging years of experience in coupling.

Code Coupling Tool

CONCORS is a system of software components that facilitates the coupling of two or more individual simulation codes for robust multi-physics simulations. CONCORS is a neutral interface coupling approach, allowing multiple codes from different development environments to be coupled under various spatial and temporal coupling schemes. A CONCORS developer's library and API are available to facilitate integration of new codes to the CONCORS system. CONCORS has been demonstrated for a three-code coupling of system codes like S5K, RELAP5, and VIPRE, and more.

Methodology

Individual codes communicate with the CONCORS Executive during coupled executions using a manager-worker communications model. The Executive manages inter-process communications of coupling data using the MPI message-passing standard, while the worker physics applications incorporate the coupling data in their native solvers. Execution may occur locally on a PC, on a single server, or in a distributed memory computing cluster.

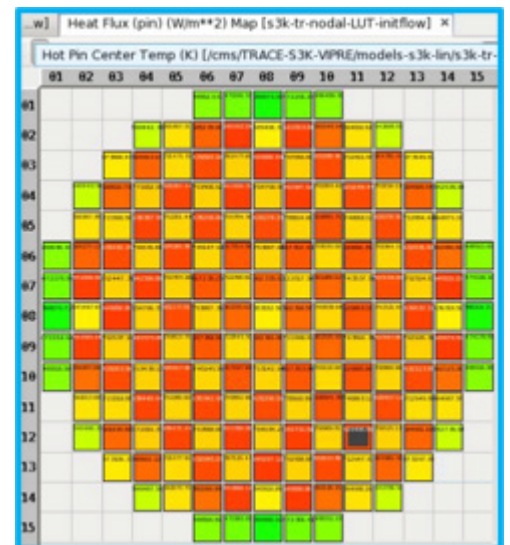


Figure 1: Power distribution and kinetic response of nuclear reactor using S5K

“ Generalized coupling methodology for linking system codes ”

Features

Key features of CONCORDS include:

- General-purpose, neutral interface code coupling system for multi-physics applications
- Inter-process communication is per MPI message-passing standard, of which there are many popular and readily available implementations
- Coupled calculations may be run locally, on a server, or in a distributed memory computing cluster.
- A developer's library and API are available to integrate individual codes to the CONCORDS system
- CONCORDS does not inherently employ or require any particular temporal or spatial coupling scheme, allowing flexibility driven by engineering decisions
- Coupling configuration inputs are checked and formalized by a lightweight preprocessor program (ATRIUM) prior to job execution
- An HDF5 "watch" database file is managed by the CONCORDS Executive, for convenient storage of key outputs from the coupled system.

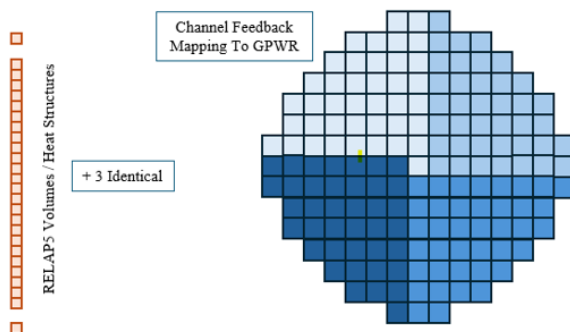
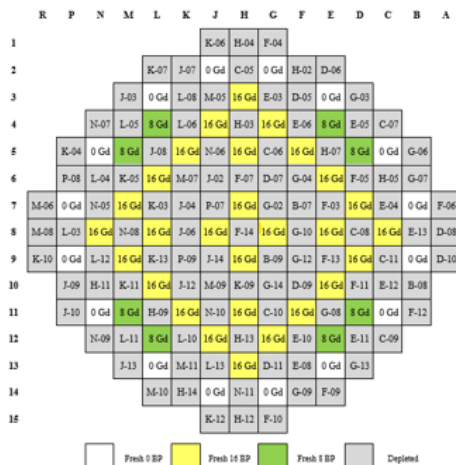


Figure 2: Two-code explicit, sequential coupling example

Integration

CONCORDS leverages Studsvik's state-of-the-art software, including S5K for coupling with any general-purpose system thermal-hydraulic code, allowing for best-estimate power plant transient analysis with core power response modeled by Studsvik's 3D full-core reactor kinetics methods.

Applications

CONCORDS applications include nuclear power plant transient analyses.

Requirements

CONCORDS is available for all standard computing platforms running most modern operating systems. Linux and Windows are typical environments for CONCORDS.

Unparalleled Customer Support

Studsvik's technical support is built on putting the needs of its customers first.

- 24-hour response time
- Easy ticketing system
- On-line support portal
- Access to technical documentation
- Active and growing user communities of practice

For further information please contact:

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