**Introduction:** Verifying that a local software installation performs as the developer intended is a potentially time consuming but necessary step for safety related codes. Automating this process not only saves time, but can increase reliability and scope of verification compared to ‘hand’ comparisons. While COMSOL does not include automatic installation verification as many commercial codes do, it does provide tools such as LiveLink™ for MATLAB® and the COMSOL API for use with Java® through which the user can automate the process.

**Computational Methods:** Using models with included solutions from the model database, we re-solve the models locally and compare the relative differences over the full model domain for all dependent or ‘solution’ variables:

\[
d_{r}u_{i} = \max \left( \frac{|u_{i}^{local} - u_{i}^{included}|}{max(|u_{i}^{included}|)} \right), \quad d_{r}^{m} = \max \left( d_{r}u_{i} \right),
\]

where \(u_{i}/\bar{u}_{i}\) is the \(i\)th dependent variable/vector over all nodes and cases. If the model maximum relative difference, \(d_{r}^{m}\), is sufficiently small, the local COMSOL installation is considered verified for the physics involved in the model.

**Verification Example:** Local COMSOL 5.0 installation for ORNL High Flux Isotope Reactor safety calculations:

**Results:** With a solver relative tolerance setting of \(10^{-3}\) (default), all models had maximum relative errors \(<10^{-4}\), which is acceptable. The models with the most relative error also had the high degrees of nonlinearity, while models with little to no nonlinearity had relative errors approaching \(10^{-16}\), which is approximately double-precision machine epsilon.

**Conclusions:** Automated installation verification represents a major improvement over the hand method.
- All model outputs are considered.
- Time required for installation verification is essentially limited to model computation time.
- COMSOL updates can be quickly verified on many local computers with minimal staff time.