



JADE

JADE (Just Another Doasa Executable) is a version of Stochastic Dual Dynamic Programming applied to the New Zealand Electricity System. EPOC have also created the Windows executable DOASA that is calibrated to the New Zealand electricity system, and is supplied to the New Zealand Electricity Authority. JADE is identical to DOASA in terms of model inputs and outputs but is written using the Julia modelling language JuMP, and so it is more flexible. It is coded in Julia and solves using the SDDP.jl package.

Examples of the flexibility of JADE are as follows:

1. JADE can admit a larger number of load blocks per stage than DOASA (restricted to 3).
2. JADE can operate in infinite horizon mode to yield steady-state water values at different times of the year. DOASA starts from a given set of reservoir levels and requires end-of-horizon water values input by the user.
3. JADE allows changes to the generation fleet and transmission network to be easily made in JuMP. (DOASA also allows this).
4. JADE incorporates the full range of risk modelling tools available in SDDP.jl.
5. JADE can make use of the distributional robustness features of SDDP.jl.

JADE was developed by researchers at the Electric Power Optimization Centre at the University of Auckland. JADE is proprietary code and is not distributed.

References:

Kapelevich, L., DOASA in Julia, Engineering Science Honours Project, 2016

Dowson, O. and Kapelevich, L., 2020. SDDP.jl: a Julia package for stochastic dual dynamic programming. *INFORMS Journal on Computing*.

Philpott, A.B. de Matos, V.L. and Kapelevich, L., Distributionally robust SDDP (<http://www.epoc.org.nz/papers/DROPaperv52.pdf>)