Penyetelan Multivariable Model Predictive Control (MMPC) Berbasis Minimalisasi Integral Square Error (ISE) pada Regasifikasi Kilang LNG = Tuning of Multivariable Model Predictive Control (MMPC) Based on Minimization Integral Square Error (ISE) for LNG Regasification Plant

Anwar Ismail, author

Abstrak

Gas alam merupakan sumber energi ketiga yang paling banyak digunakan di Indonesia, setelah minyak bumi dan batubara. Agar lebih mudah ditranportasikan, gas alam diubah menjadi LNG kemudian diubah kembali melalui proses regasifikasi LNG. Diperlukan sistem pengendali agar proses regasifikasi LNG dapat berjalan lancar. Multivariabel model predictive control (MMPC) merupakan pengendali tingkat lanjut yang dapat digunakan pada sistem regasifikasi LNG. Terdapat tiga parameter pada MMPC, yaitu sampling time (Ts), prediction horizon (P), dan control horizon (M). Pada penelitian ini, dilakukan penyetelan MMPC untuk mendapatkan parameter MMPC dengan menggunakan metode minimalisasi nilai integral of square error (ISE). Kinerja pengendalian MMPC dengan tuning minimalisasi nilai ISE kemudian dibandingkan dengan pengendalian MMPC hasil fine-tuning (trial and error) dan didapatkan bahwa kinerja MMPC dengan tuning minimalisasi nilai ISE lebih baik. Selain itu, proses tuning dengan minimalisasi nilai ISE lebih mudah dilakukan dibanding fine-tuning (trial and error) karena dapat berjalan secara otomatis. <hr /> Natural gas is the third most widely used energy source in Indonesia, after oil and coal. To make it easier to transport, natural gas is converted into LNG and then converted back through the LNG regasification process. A control system is needed so that the LNG regasification process can overcome the disturbances that arise. Multivariable model predictive control (MMPC) is an advanced controller that can be used in LNG regasification systems. There are three parameters in MMPC, namely sampling time (Ts), prediction horizon (P), and control horizon (M). In this study, the MMPC was tuned to obtain the MMPC parameters by using the integral of square error (ISE) minimization method. The performance of the MMPC control by tuning the ISE minimization value was then compared with the MMPC control with the results of fine-tuning (trial and error) and it was found that the performance of the MMPC by tuning the minimization of the ISE value was better. In addition, the tuning process by minimization of the ISE value is easier to do than fine-tuning (trial and error) because it can run automatically.