Taylor polynomial Approximation and Adaptive Passivity-Based Control Applied to the Level Regulation of a Conical Tank

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ASIAN JOURNAL OF CONTROL
Volume: 19
Issue: 5
Pages: 1722-1730
DOI: 10.1002/asjc.1496
Published: SEP 2017
Document Type: Article

View Journal Impact

Abstract

The techniques of Taylor polynomial approximation (TPA) and adaptive passivity-based controller (APBC) are combined in this study and applied to the level regulation of a conical tank. The design and comparative experimental results with a classical PI controller are presented. After combining these two approaches a robust adaptive controller named TPA-APBC, which is simpler than the classical APBC and PI controller, is obtained. This new TPA-APBC preserves the stability of the overall system after assuming that the nonlinear system is unknown and that it can be suitably represented by a first-order linear model with unknown parameters.

Keywords

Author Keywords: Nonlinear control; Taylor series; Adaptive control; Passivity-based control; Conical tank

KeyWords Plus: NONLINEAR-SYSTEMS

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Funding

<table>
<thead>
<tr>
<th>Funding Agency</th>
<th>Grant Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>USACH through the project DICYT</td>
<td>041572TT</td>
</tr>
<tr>
<td>CONICYT Chile</td>
<td>Basal AMTC FB0809</td>
</tr>
<tr>
<td></td>
<td>FONDECYT 1150488</td>
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</tbody>
</table>

Journal Information

- Impact Factor: [Journal Citation Reports](#)

Categories / Classification

Research Areas: Automation & Control Systems

Web of Science Categories: Automation & Control Systems