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STEADY FLOW ANALYSIS AND MODELING OF THE GAS DISTRIBUTION NETWORK USING THE ELECTRICAL ANALOGY (RESEARCH NOTE)

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Abstract The mathematical modeling of a gas network is a powerful tool in order to identify the behavior of system under the different conditions. The modeling can be performed both for the steady state and unsteady state conditions. It is possible to use the fluid flow basic governing equations or the electrical analogy concept for developing the model. The second approach provides a simpler and more robust model, especially in large networks with different and numerous components. In this study this approach has been used for studying the steady state behavior of a sample gas distribution network. The model is verified by comparing its results with some existing experimental and numerical data. The comparison shows a very good agreement between the two results.

Keywords Natural Gas Transmission and Distribution Network Modeling, Steady State Analysis, Electrical Analogy, electrical element, Pipeline Resistance Model

چکیده مدل‌سازی ریاضی شبکه گاز، ابزاری قدرتمند به منظور شناخت رفتار سیستم در شرایط مختلف می باشد. این مدل‌سازی می تواند در دو حالت پایا و ناپایا انجام پذیرد. به منظور توسعه مدل مناسب، می توان از معادلات پایه حاکم بر جریان سیال و یا از مفهوم تشابه الکتریکی استفاده نمود. دیدگاه دوم در مدل‌سازی، شرایط به مراتب ساده تری را به مخصوص در مواجهه با شبکه های بزرگ با اجزاء فراوان فراهم می کند. در این مقاله، مدل‌سازی رفتار پایای شبکه توزیع گاز با استفاده از نگرش تشابه الکتریکی صورت گرفته است. همچنین نتایج این مدل‌سازی با نتایج برخی کارهای موجود تجربی و عددی مقایسه شده است. مقایسه صورت گرفته نواقف خوبی را بین نتایج نشان می دهد.

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