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Domain Interval Tertutup
Fani Haerul Anam Rofi'i, Hadrian Andradi, M.Sc., Ph.D.
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INTISARI

DOMAIN INTERVAL TERTUTUP

Oleh

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Teori domain memberikan kerangka teori urutan untuk mempelajari struktur kontinuitas dan topologis pada himpunan terurut parsial (*poset*). Secara khusus, domain interval terutup memiliki peranan penting menghubungkan struktur urutan dan sifat topologis pada *poset*. Pada tesis ini, dibahas struktur dan sifat-sifat poset interval tertutup dalam kerangka teori domain. Pembahasan diawali dengan pengembangan konsep dasar teori domain, termasuk *poset*, *directly complete poset* (*dcpo*), dan sifat-sifat terkait. Analisis terkait *poset* interval tertutup dilakukan yang menghasilkan karakterisasi utama domain interval tertutup, yaitu bahwa suatu *poset* interval tertutup merupakan domain jika dan hanya jika *poset* yang mendasarinya merupakan *weakly bi-cpo* yang bikontinu lokal. Hasil lain yang diperoleh meliputi ekuivalensi antara *weakly dcpo* dan *principal dcpo*, serta hubungan antara kekontinuan dan kekontinuan lokal poset. Pada tesis ini, juga dipelajari fungsi kontinu bi-Scott, dengan menunjukkan bahwa suatu fungsi monoton bersifat kontinu bi-Scott jika dan hanya jika fungsi tersebut kontinu Scott dan secara dual juga bersifat kontinu Scott. Selain itu, dibuktikan dua teorema perluasan kekontinuan Scott, yang menyatakan bahwa dalam kondisi tertentu, fungsi kontinu bi-Scott pada poset dapat diperluas menjadi fungsi kontinu Scott pada domain interval yang dibangun. Lebih lanjut, dibahas pula beberapa topologi pada poset yang berkaitan dengan struktur interval tertutup, yaitu topologi Scott, topologi bi-Scott, topologi Scott kuat, topologi T-*generated*, topologi urutan, dan topologi DF. Diperoleh pula hasil mengenai syarat cukup sehingga diperoleh kesamaan topologi-topologi tersebut.

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ABSTRACT

CLOSED INTERVAL DOMAIN

By

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Domain theory provides an order-theoretic framework for studying continuity, approximation, and topological structures on partially ordered sets (posets). In particular, closed interval domains play an important role in connecting order-theoretic and topological properties of posets. This thesis studies the structure and properties of closed interval posets within the framework of domain theory. The work begins by developing the foundational concepts of domain theory, including posets, directed complete partial orders (dcpo), and related notions. A detailed analysis of closed interval posets is conducted, leading to a key characterization: a closed interval poset forms a domain if and only if the underlying poset is a locally bicontinuous weakly bi-cpo. Further results include the equivalence between weakly dcpo and principal dcpo, as well as relationships between continuity and local continuity in certain classes of posets. The thesis also investigates bi-Scott continuous functions, establishing that a monotone function is bi-Scott continuous if and only if it is Scott continuous in both the original and dual orders. Two Scott continuity extension theorems are proven, showing that under suitable conditions, bi-Scott continuous functions on posets can be extended to Scott continuous functions on their associated interval domains. In addition, several topologies on posets related to closed interval structures are examined, including the Scott topology, bi-Scott topology, strong Scott topology, T-generated topology, order topology, and DF topology. A significant result is obtained concerning the coincidence of these topologies under specific structural conditions on the poset.