

# Frictional Sliding of Rough Surfaces Using a Quasi-static Approach to the Maxwell-slip Model

Aydin Amireghbali

Middle East Technical University: Orta Dogu Teknik Universitesi

Demirkan Coker (✉ [coker@metu.edu.tr](mailto:coker@metu.edu.tr))

Middle East Technical University: Orta Dogu Teknik Universitesi <https://orcid.org/0000-0001-7385-7089>

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## Research Article

**Keywords:** Sliding friction, Maxwell-slip model, Roughness, Stick-slip, Aseismic creep

**Posted Date:** April 26th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-441371/v1>

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## Abstract

The Maxwell-slip model consists of independent mass-spring units that are slipped by a driver over a rigid, flat, fixed substrate. In the present study, the model is interpreted as a multi-asperity model and is used to study both the friction force and the mechanisms involved in the sliding of a rough elastic surface. Coulomb friction law is assumed at the single mass-spring level. A beta probability distribution function is used to generate the initial block positions randomly. The standard deviation of the initial lateral position of the blocks is interpreted as the surface roughness. The results show that when the surface is rough enough, the sequential slip of the blocks induces a steady friction force. On the other hand, when the surface is smooth enough, the collective slip of the blocks induces stick-slip. The border between the two regimes of sliding is sharply delineated by a specific roughness value. A tribological implication is that a sufficiently rough surface may bring about steady sliding. A geophysical implication is that a geological fault segment that undergoes aseismic creep may have a rougher surface compared to its locked counterpart.

## Full-text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

## Figures

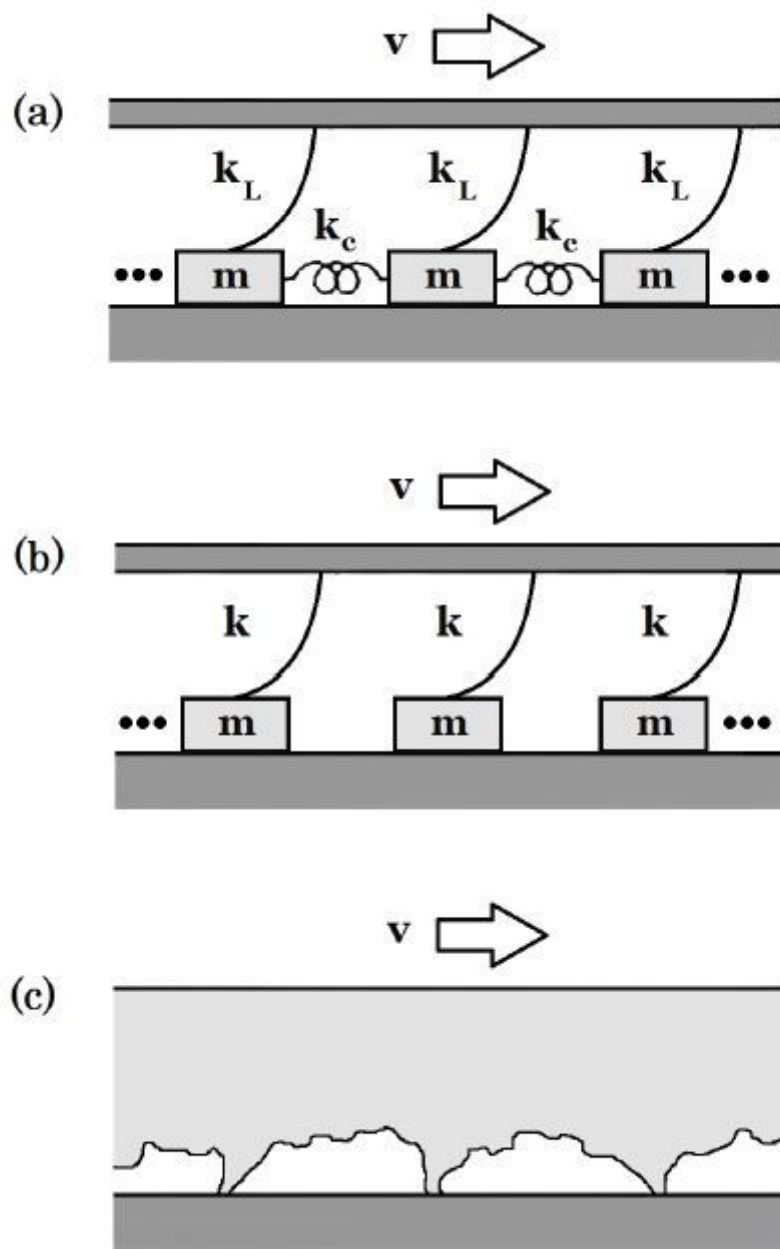


Figure 1

please see the manuscript file for the full caption

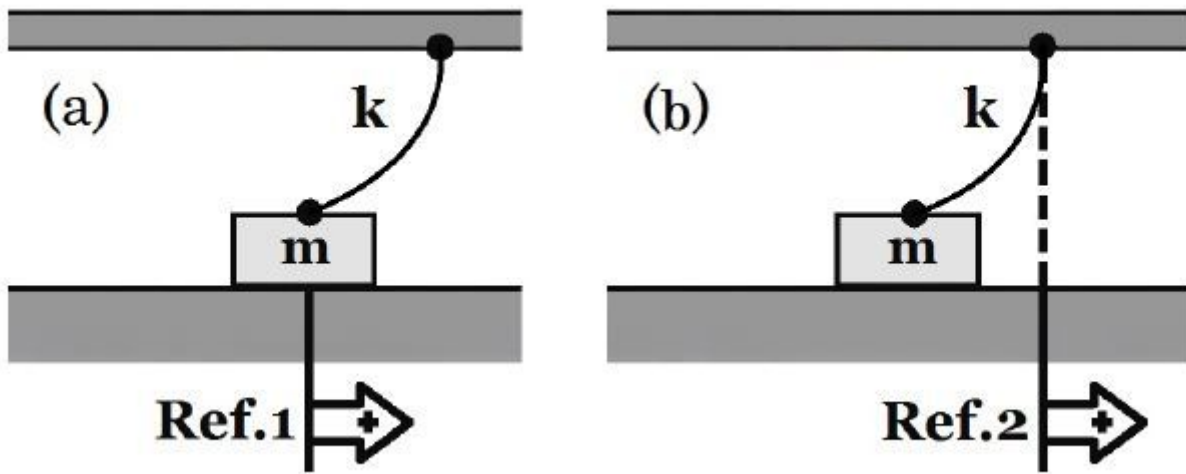


Figure 2

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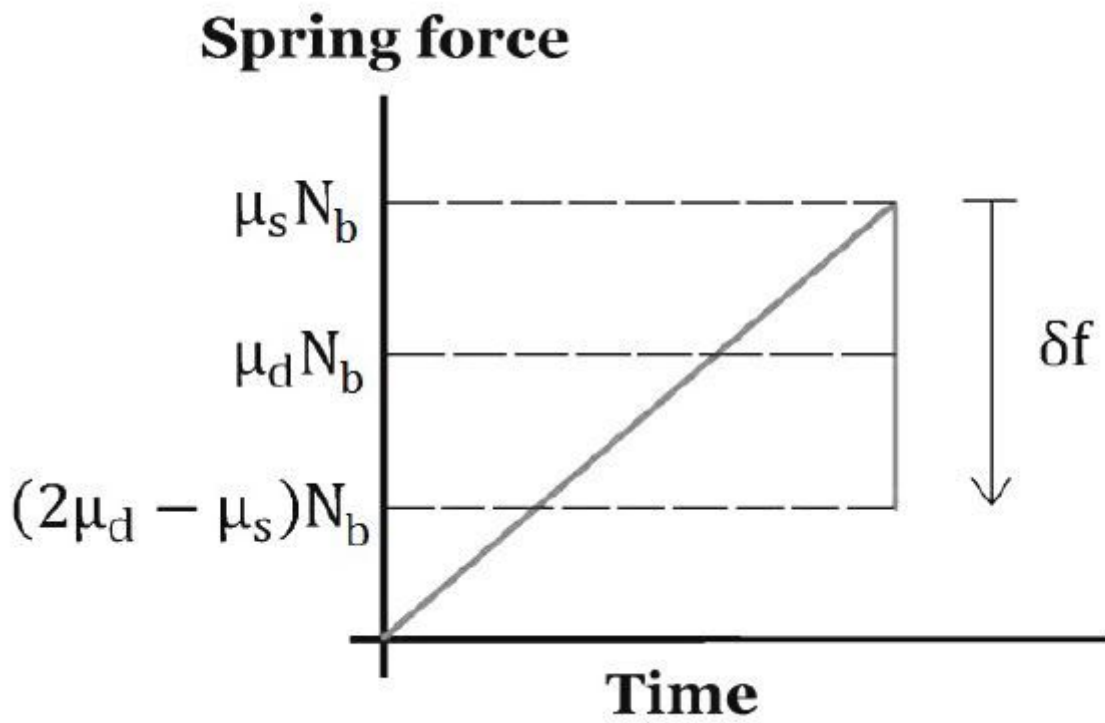


Figure 3

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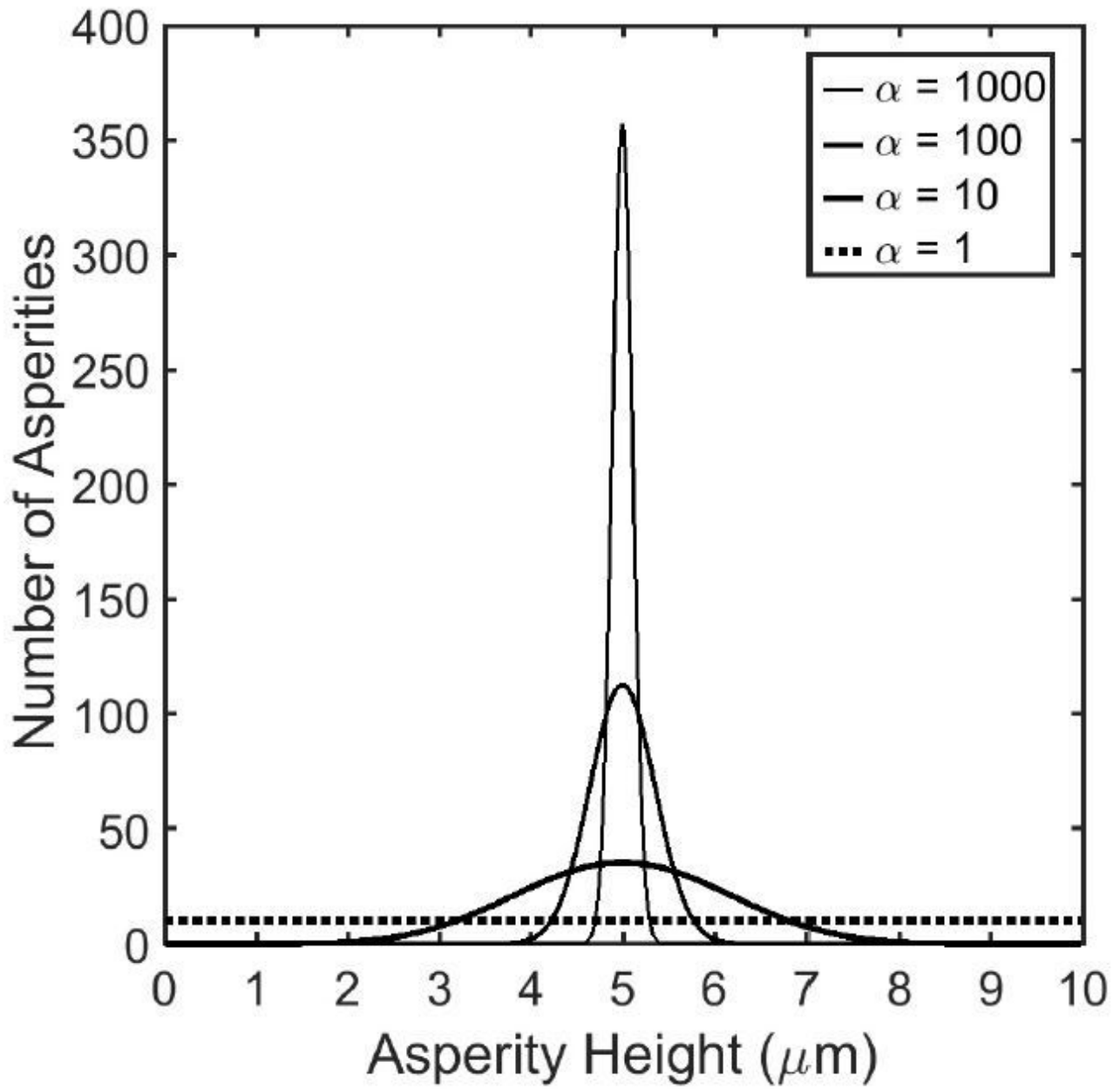


Figure 4

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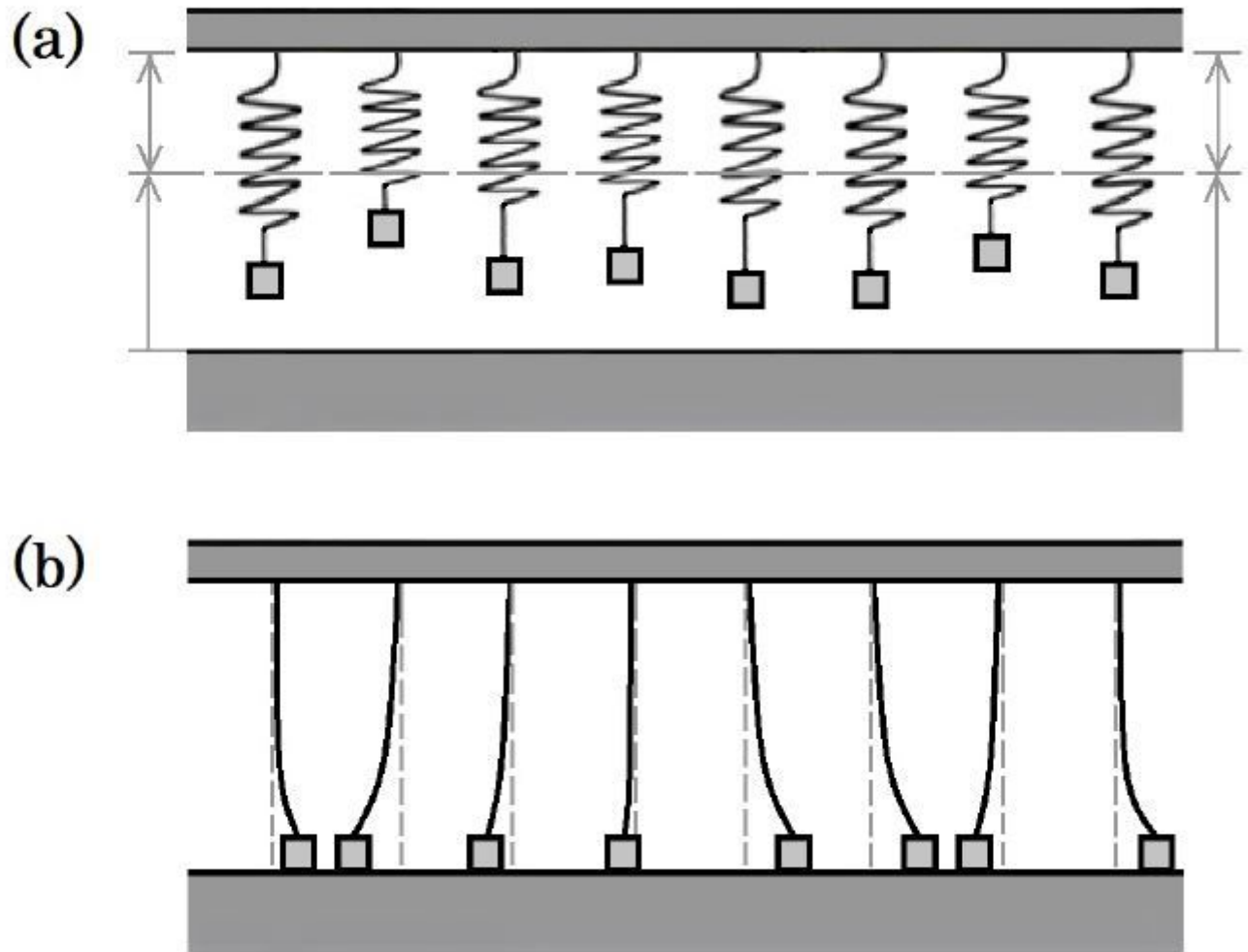


Figure 5

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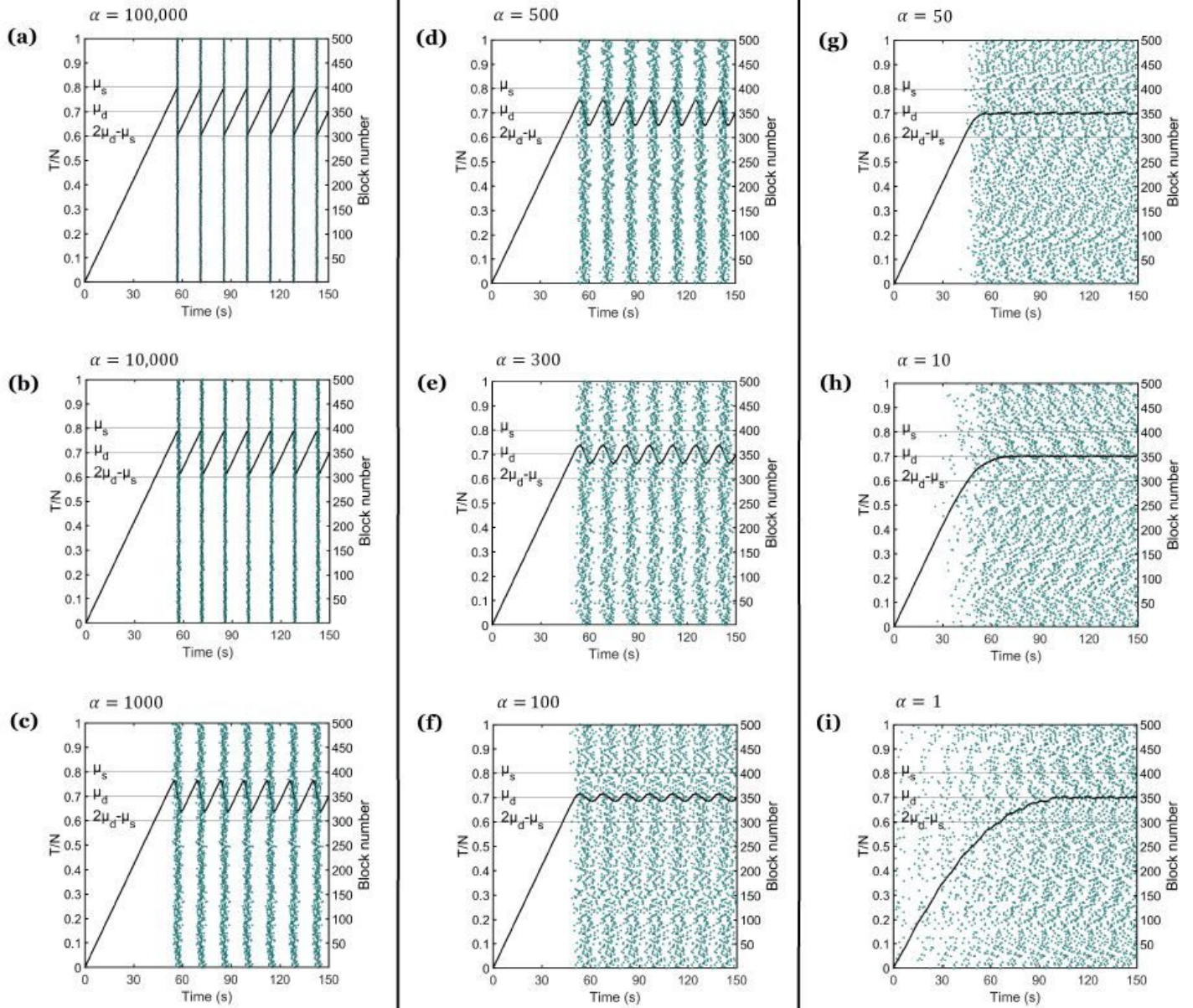


Figure 6

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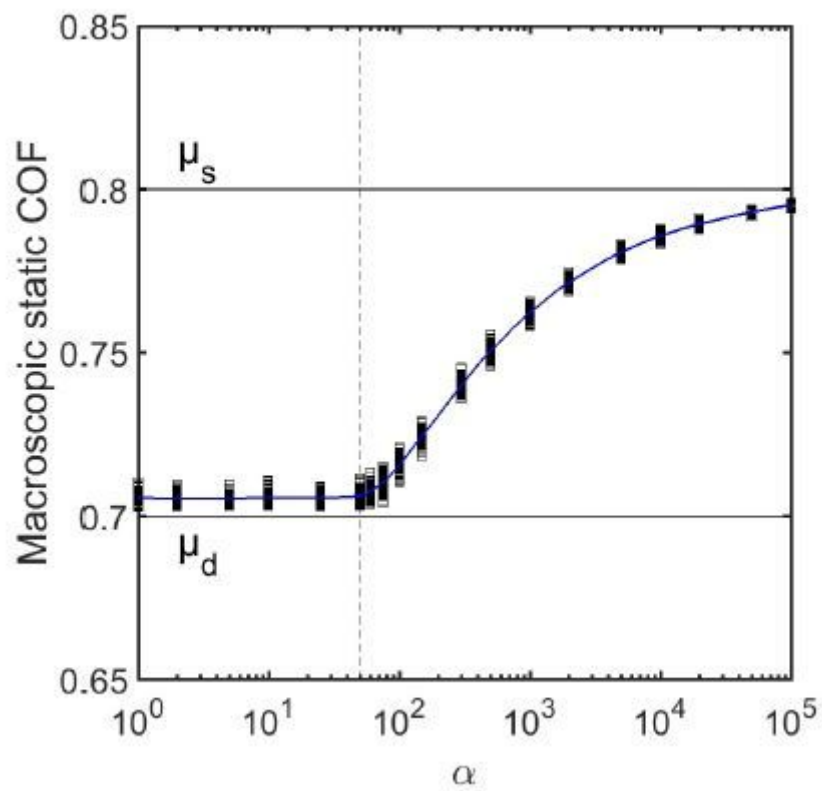


Figure 7

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