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Fatigue crack growth under variable-amplitude loading. II: Code development and model validation. (English) [Zbl 1169.74579](#)

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This two-part paper [part I: [Zbl 1169.74485](#)] presents formulation and validation of a non-linear dynamical model of fatigue crack growth in ductile alloys under variable-amplitude loading including single-cycle overloads, irregular sequences, and random loads. The model is formulated in the state-space setting based on the crack closure concept and captures the effects of stress overload and reverse plastic flow. The state variables of the model are crack length and crack opening stress. This paper, which is the first part, presents formulation of the state-space model that can be restructured as an autoregressive moving average (ARMA) model for real-time applications such as health monitoring and life extending control. The second part is the companion paper that is dedicated to model validation with fatigue test data under different types of variable-amplitude and spectrum loading.

MSC:

[74R99](#) Fracture and damage
[74R10](#) Brittle fracture
[37N15](#) Dynamical systems in solid mechanics

Cited in **1** Review
Cited in **1** Document

Software:

[FASTRAN](#); [AFGROW](#)

Full Text: [DOI](#)

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