your pieces of art. And it pretty dangerous to avoid commands or the leader in the army.

Solving everyday problems. Many firms without understanding of their corporate culture cannot find the cause of some production troubles and inconsistency in some management solutions.

Inculcation of changes. Even after finding all causes of problems and even all probable solutions sometimes it's impossible to put them into practice because it makes every worker and manager change their behavioral patterns related to their job for several years. Corporate culture analysis helps to find the way of inculcation most suitable for this group of people.

Every company has its own organization of work, system of relations, behavioral patterns of collaborators. The task of manager and every other leader is to analyze the working process of people and to use it in order to reach the most profitable way of resource spending and production organization.

NOISE-INDUCED REENTRANT TRANSITION OF THE STOCHASTIC DUFFING OSCILLATOR

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The dissipative stochastic system is defined by the equation:

$$\frac{d^2x}{dt^2}+\gamma\frac{dx}{dt}+\sqrt{D}\xi(t)x=-\frac{\partial U}{\partial x}, \qquad (1)$$

where $x(t)$ is the position of the oscillator at time t, γ the dissipation rate and $\xi(t)$ denotes a stochastic process. The confining, anharmonic potential $U(x)$ is defined as:

$$U(x)=-\frac{1}{2}\mu x^2+\frac{1}{4}x^4, \qquad (2)$$

where μ is a real parameter. Without noise, the corresponding deterministic system undergoes a forward pitchfork bifurcation when the origin becomes unstable as μ changes sign from negative to positive values. Let's study the case $\mu > 0$ ('inverted' Duffing oscillator) and show that for a finite range of positive values of μ, a reentrant transition is observed when the noise amplitude is varied: the noisy oscillations obtained for weak and strong noise are suppressed for noise of intermediate amplitude. The results are non-perturbative: they are based on an exact calculation of the Lyapunov exponent, performed for arbitrary parameter values, $\xi(t)$ being a Gaussian white noise process.

We first rescale the time variable by taking the dissipative scale γ^{-1} as the new time unit. Equation (1) then becomes

$$\frac{d^2x}{dt^2}+\frac{dx}{dt}-\alpha x+x^3+\sqrt{\Delta}\xi(t)x=0, \tag{3}$$

where we have defined the dimensionless parameters

$$\alpha=\frac{\mu}{\gamma^2}\ \text{ and }\ \Delta=\frac{D}{\gamma^3}, \tag{4}$$

and rescaled the amplitude $x(t)$ by a factor γ. Linearizing equation (3) about the origin, we obtain the following stochastic differential equation:

$$\frac{d^2x}{dt^2}+\frac{dx}{dt}-\alpha x+\sqrt{\Delta}\xi(t)x=0. \tag{5}$$

The Lyapunov exponent of a stochastic dynamical system is generally defined as the long-time average of the local divergence rate from a given orbit. In the case discussed here, deviations from the orbit defined by the origin in phase space, satisfy equation (5). After simple transformations we obtain the following expression for the Lyapunov exponent Λ:

$$\Lambda(\alpha,\Delta)=\frac{1}{4}\sqrt{1+4\alpha}\,g(\tilde{\Delta})+\frac{1}{2}(\sqrt{1+4\alpha}-1), \tag{6}$$

where the function $g(x)$ is defined for $x>0$ as

$$g(x)=\frac{\int_0^\infty du\sqrt{u}\,e^{\frac{2}{x}\left(u-\frac{u^3}{12}\right)}}{\int_0^\infty \frac{du}{\sqrt{u}}\,e^{\frac{2}{x}\left(u-\frac{u^3}{12}\right)}}-2. \tag{7}$$

From this analysis, the bifurcation diagram of the nonlinear oscillator with parametric, Gaussian white noise follows immediately. The origin is stable when the Lyapunov exponent of the linearized system is negative. The bifurcation line $\alpha=\alpha_c(\Delta)$ is defined by the equation

$$\Lambda(\alpha_c(\Delta),\Delta) = 0. \quad (8)$$

The transition is best qualified as a stochastic Hopf bifurcation. For $\Delta \le \Delta^* \approx 3.55$ the origin is stabilized by the stochastic forcing in the range $0 \le \alpha \le \alpha_c(\Delta)$. The full bifurcation diagram of the inverted stochastic Duffing oscillator is displayed in Figure 1. In the weak noise limit $\Delta \to 0^+$, we obtain from equation $\alpha_c(\Delta) \sim (-2g'(0)\Delta) \sim \Delta/2$, in agreement with the result of the Poincare-Linstedt expansion.

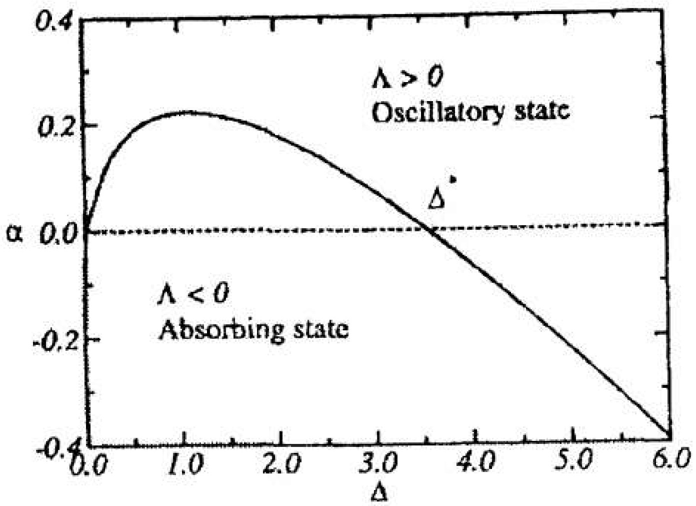

Fig. 1. Bifurcation diagram of the Duffing oscillator with parametric white noise. The solid line is the locus in parameter space (α, Δ) where $\Lambda(\alpha, \Delta) = 0$. The bifurcation line $\alpha = 0$ of the noiseless dynamical system is drawn for comparison (dotted line).

The stability of the origin of the nonlinear random dynamical system (3) cannot be deduced from a stability analysis of finite-order moments of the linearized system: indeed second-order moments of solutions of equation (5) with white noise forcing are always unstable when α is positive. The proper indicator of the transition of the nonlinear system is the Lyapunov exponent of solutions of the linearized equations.

USE AND EXCHANGE VALUE

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The word value, it is to be observed, has two different meanings, and sometimes expresses the utility of some particular object, and sometimes the power of purchasing other goods which