



<b>Publication Year</b>	2015
<b>Acceptance in OA @INAF</b>	2020-04-09T12:34:07Z
<b>Title</b>	VizieR Online Data Catalog: Exoplanetary systems fundamental parameters (Damiani+, 2015)
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<b>Handle</b>	<a href="http://hdl.handle.net/20.500.12386/23956">http://hdl.handle.net/20.500.12386/23956</a>
<b>Journal</b>	VizieR Online Data Catalog



Evolution of angular-momentum-losing exoplanetary systems.  
Revisiting Darwin stability.

Damiani C., Lanza A.F.

<Astron. Astrophys., 574, A39-39 (2015)>

=[2015A&A...574A..39D](#)

**ADC\_Keywords:** Stars, double and multiple ; Binaries, orbits

**Keywords:** planets and satellites: dynamical evolution and stability -  
planet-star interactions - stars: late-type - methods: analytical

**Abstract:**

We assess the importance of tidal evolution and its interplay with magnetic braking in the population of hot-Jupiter planetary systems. By minimizing the total mechanical energy of a given system under the constraint of stellar angular momentum loss, we rigorously find the conditions for the existence of dynamical equilibrium states. We estimate their duration, in particular when the wind torque spinning down the star is almost compensated for by the tidal torque spinning it up. We introduce dimensionless variables to characterize the tidal evolution of observed hot Jupiter systems and discuss their spin and orbital states using generalized Darwin diagrams based on our new approach. We show that their orbital properties are related to the effective temperature of their host stars. The long-term evolution of planets orbiting F- and G-type stars is significantly different owing to the combined effect of magnetic braking and tidal dissipation. The existence of a quasi-stationary state, in the case of short-period planets, can significantly delay their tidal evolution that would otherwise bring the planet to fall into its host star. Most of the planets known to orbit F-type stars are presently found to be near this stationary state, probably in a configuration not too far from what they had when their host star settled on the zero-age main sequence. Considering the importance of angular momentum loss in the early stages of stellar evolution, our results indicate that it has to be considered to properly test the migration scenarios of planetary system formation.

**File Summary:**

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
<a href="#">table4.dat</a>	140	109	Main stellar and planetary parameters of the systems considered in Sect. 4

**Byte-by-byte Description of file:** [table4.dat](#)

Bytes	Format	Units	Label	Explanations
1- 11	A11	---	Name	Star name
13- 18	F6.4	<a href="#">d</a>	Porb	[0.7/9.5] Orbital period of the planet (error typically smaller than 10 <sup>-5</sup> d)
20- 24	F5.3	<a href="#">AU</a>	a	[0.01/0.09] Semi-major axis of the orbit (error typically smaller than 10 <sup>-3</sup> AU)
26- 30	F5.3	---	e	[0/0.1] Eccentricity of the orbit
32- 36	F5.3	---	E_e	[0/0.1]? Error on Eccentricity (upper value)
38- 41	F4.2	---	e_e	[0/0.1]? Error on Eccentricity (lower value)
43- 47	F5.2	<a href="#">Mjup</a>	Mp	[0.02/11] Planet mass (in Jupiter mass)
49- 52	F4.2	<a href="#">Mjup</a>	E_Mp	[0/1.6] Error on Mp (upper value)
54- 57	F4.2	<a href="#">Mjup</a>	e_Mp	[0/1.6] Error on M (lower value)
59- 62	F4.2	<a href="#">Rjup</a>	Rp	[0.2/1.8] Planet radius (in Jupiter radius)
64- 67	F4.2	<a href="#">Rjup</a>	E_Rp	[0/1] Error on Rp (upper value)
69- 72	F4.2	<a href="#">Rjup</a>	e_Rp	[0/1] Error on Rp (lower value)
74- 77	F4.2	<a href="#">Msun</a>	M*	[0.6/1.6] Star mass
79- 82	F4.2	<a href="#">Msun</a>	E_M*	[0.01/0.2] Error on M* (upper value)
84- 87	F4.2	<a href="#">Msun</a>	e_M*	[0.01/0.2] Error on M* (lower value)
89- 92	F4.2	<a href="#">Rsun</a>	R*	[0.6/2.3] Star radius
94- 97	F4.2	<a href="#">Rsun</a>	E_R*	[0.01/0.2] Error on R* (upper value)
99-102	F4.2	<a href="#">Rsun</a>	e_R*	[0.01/0.2] Error on R* (lower value)
104-107	I4	<a href="#">K</a>	Teff	Effective temperature
109-111	I3	<a href="#">K</a>	e_Teff	rms uncertainty on Teff
113-116	F4.1	<a href="#">km/s</a>	vsini	[0.2/40] Rotational velocity
118-120	F3.1	<a href="#">km/s</a>	E_vsini	[0/5] Error on vsini (upper value)
122-124	F3.1	<a href="#">km/s</a>	e_vsini	[0/5] Error on vsini (lower value)
126-130	F5.1	<a href="#">deg</a>	lambda	?= Projected obliquity λ (angle between the stellar spin axis and the orbital pole)
132-135	F4.1	<a href="#">deg</a>	E_lambda	? Error on lambda (upper value)
137-140	F4.1	<a href="#">deg</a>	e_lambda	? Error on lambda (lower value)

**History:**

From electronic version of the journal

(End)

Patricia Vannier [CDS] 09-Mar-2015

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